NATURE MAGAZINE

SEPTEMBER 1931 35¢ VOL. 18, NO. 3

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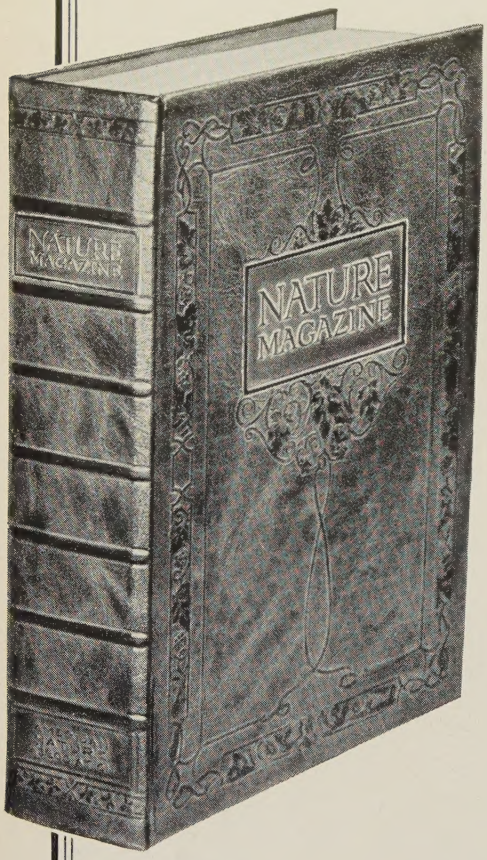

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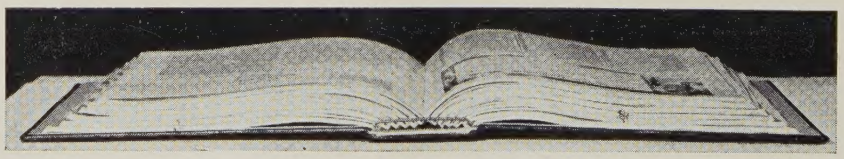

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KINGSTON, JAMAICA, B.W.I. The Constant Spring

UNITED HOTELS

Editor's Note: Eleanor B. Walker, who regularly conducts this column, is out in the field storing up new experiences for future months. She will be back in October. In the meantime, we present travel news from many places.

The law of supply and demand is responsible, of course, for the curious fact that this summer, when nearly every one is conducting a front porch campaign instead of traveling, railroad and steamship prices are less expensive than for years. Wicker furniture is outselling personally conducted tours, yet there never were such bargains as still remain on the ticket-office counters. One may go to California and back, for example, for $125 rail fare, and to Colorado for $80. The French Line is offering a $75 seven-day cruise to Bermuda and Halifax and the United States Lines have round-trip rates to Europe as low as $115. Other companies are shearing costs with equal generosity. There is still time for those frightened by the huge shadow cast by the depression as it retreats to leave their rocking chairs and hot cities, and hie themselves to the conquest of new worlds more cheaply than ever before.

* * *

Speaking of worlds, how would you like to conquer this old world—and do it in all the comfort and luxury possible? If this thought appeals to you, the news of the Round-the-World trip offered by Cunard will be a clarion call to bring you to New York in time to catch the *S. S. Franconia* before she steams out past the Statue of Liberty for a four-and-a-half months cruise on January 9. The *Franconia* is a perfectly appointed ship—large and speedy enough to satisfy all, yet sufficiently petite to crawl into all the corners of the earth. She is equipped for all sports except golf, has a celebrated cuisine, and lovely lounges and dance-floors. She will stop first at the Madeira Islands, then at Gibraltar, Monaco and the French Riviera, Naples, Pompeii and the Holy Land. Egypt, India, Ceylon, the Malay States, Siam, Java, China, Korea, Formosa and Japan follow in order on the itinerary, and each country is to be visited at just the time when the 180 years combined experience of Cunard and Cook advises that conditions are at the optimum. The return will be made by way of California, the Panama Canal and Cuba. Numerous side trips are offered in connection with the cruise, and alternative plans, which permit a visit to Russia and return to the United States by way of Europe and the bigger boats, may be arranged. Prices range from $4200 to $1750. Houp-la! And when we get back the depression will probably be over!

* * *

Paris, subject of more adjectives than any other city in the world, has two new attractions eclipsing some of the other standbys.

(Continued on page 135)

FRANCONIA WORLD CRUISE

The East, in all its gorgeous reality ... primitive, fantastic isles... adventurous outposts. Bali, still untouched by western civilization... Benares, India's most fascinating city... Saigon and the marvels of Cambodia... Canton, Seoul, Nikko, all part of this great World Cruise... at no extra cost... together with every other highlight of such a voyage.

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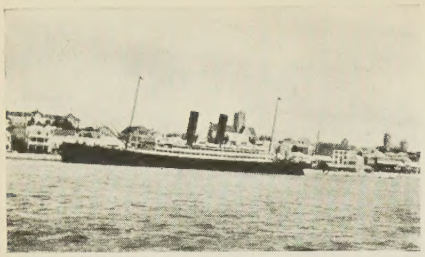


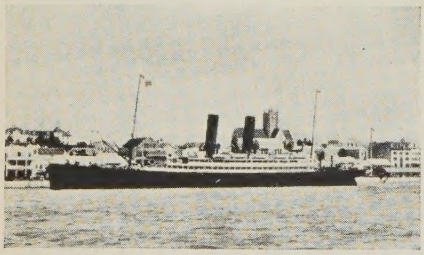
No. 1, What happens when we tip the camera

Hold the Camera Straight

Above we see a picture of a steamship making its way up a hill of water and yet we know that water does not run up hill. When this picture was made, the camera was tipped up considerably and this brought the result shown.

Picture No. 2 was made with the camera held quite level and the result is as it should be. Care should be taken to hold the camera level, especially for subjects of this kind and also when taking pictures of buildings. If we tip the camera up, the vertical lines of the building will converge and it will appear in the picture to be leaning backward. If we cannot get the entire image of a tall building in the finder from where we stand, it is best to move back and make the picture from a position where it can all be seen in the finder without tipping the camera up.

True, it may be necessary to get a considerable distance away and thereby the image will be small, but we can always make an enlargement of any particularly desirable subject or part of a negative.



No. 2. The result with camera held straight

Double Exposure

Even the most accomplished alibi artist could never blame his camera for making a double exposure. There's only one way such a disappointment can occur; that's by failing to wind a new section of film into position between exposures.

A double exposure not only wastes film, but also spoils two pictures—pictures that may not be easy to get again. Play safe by following this rule—always turn the film to the next number *immediately* after making the exposure. Then the camera will be all set for the next interesting incident that appears.

Photographic DEPARTMENT

EDITED BY ROBERT LOWELL

The School Bell

Do you know that sound? There is no other quite like it, so that you are sure to recognize it when it cuts sharply into the September air—the school bell!

There have been times when you were afraid to hear it, when if you heard it the summons would come from a distance, because you were late. There have been times (unless you were a very unusual person) when you were a little tired of hearing it, because it was toward the end of the season and you were all set for vacation adventures.

But after vacation!—that is another matter. Then it sounds like the good old school bell. It even has a kind of adventurous novelty. You are to get back with the old crowd and to meet all the new faces. There may be a new teacher.

You may be going to school for the first time and *everything* may be new. Nothing that ever happened to you afterward will have quite the thrill of that. You are going to school. You are now a *person* in the world.

In this case you will go forth with a certain importance of ceremony at home. After that you will often be inspired by receiving a special sort of good-by. Even if you have become a seasoned schoolgoer you are pretty sure of particular attention at home on that first day after vacation. Big Brother or Sister may be on hand with the camera (or maybe it might be Father—I can testify that it might be Father) to make historic record of the event.

It really *is* an event. The older I grow, and the more I study my own snapshots, the more clearly I understand that the important events of life are not by any means always the sort that seem momentous at the time. Simple moments are often wonderfully significant as we look back upon them, especially if we have pictures.

News of the Picture Contest

The great number of very fine pictures entered in NATURE MAGAZINE'S $500.00 Contest, which closed July 31, is graphic evidence not only that amateurs know how to make technically good pictures, but that they know what makes an interesting subject. Then, too, they seem to have had a regard for composition—what to leave out —what to include—and the best point of view from which to "shoot."

The judges found it difficult to narrow down the number of meritorious pictures to the required sixty-eight for which prizes are to be awarded. Many photographs just missed out by a slim margin and we wish space were available to print the long list of names that should go under an "Honorary Mention" heading.

NATURE MAGAZINE compliments all these amateur photographers and extends heartiest congratulations to the prize winners in advance of announcement.

Next month, and in subsequent issues, it is planned to reproduce some of the prize winners, at which time the names and addresses of the authors of the pictures will also be given.

The uninvited guest

The dolls did not invite Kitty but Mistress Betty did. The cat was unwilling to pose until a small saucer of milk was placed on the festive board—then "click" went the camera.

Newsy Notes

Literature on Request

A remarkable new movie film for amateur use permits of taking indoor pictures at night with lights but little stronger than are used for ordinary illumination in the home. Super-speed Panchromatic is the name.

A traveling school that teaches photo coloring of all kinds is unique. Oil coloring, from light pastel to solid brush work, is all covered thoroughly. Photo papers, positive celluloids, opals, miniatures, sensitized cloths and translites are considered. One-week courses are listed and students may attend afternoons or evenings. Marshall School of Photo Coloring. Itinerary on request.

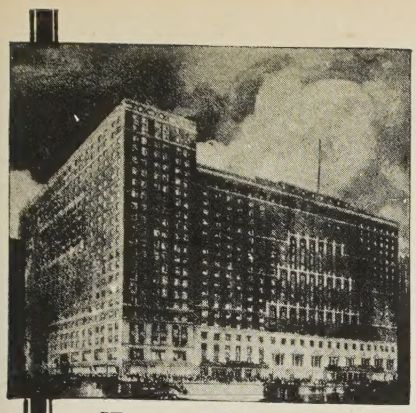
There is now on the market a movie camera for $10 and a projector for $12.75! Both hand cranked, of course. The Vitascope Corporation makes these available. More information if desired.

The slimmest, most compact camera ever made is the description given to the Kawee camera. It is said to be light and remarkably rigid. Takes the handy film packs (12 exposures each) or plates. Kawee is the name.

Then there is another novel camera which is said to work on an entirely new principle. It also is compact and takes 12 "shots" with an ordinary No. 2 Brownie size film. This little outfit is given the name of Cupid and sells at a remarkably low price. Circulars are available.

A snapshot wallet called the Foto-Tainer has recently been introduced. It has pockets for different size pictures and unlike an album, permits one to easily carry his favorite pictures with him to spring on unsuspecting friends.

Two new roll films were placed on the market last Spring. Agfa Plenachrome and Kodak Verichrome are the respective names. They are both fast and have greater ability to give proper renditions of color values in monochrome. Freedom from halation and great latitude are claimed.



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TRAVEL DEPARTMENT

(Continued from page 133)

First, the Eiffel Tower has been painted a yellow, "between lemon and jonquil". Secondly, the International Colonial and Overseas Exposition brings to this "hostess of the world" a symposium of everything on earth. The whole globe is spread out within a few blocks in the Bois de Vincennes. One sees here the churches, restaurants, gardens, homes, vehicles, sports, clothing and domestic and savage animals of every populated spot. Temples from Indo-China range beside desert caravansaries and Icelandic fisher-huts. The totem poles of the savage stand next to the finest conception of chisel, brush and pen in a panorama of the history of art. More than three thousand living actors have been transported from the far corners of the earth to take part in this drama of the empire builders. The Exposition lasts until October, and is said to be alone worth the trip abroad.

* * *

The Northland in the fall is a blazing cauldron of yellows and reds and browns and blues. Florida blossoms in the spring, but the country in the northeast part of North America chooses to wait until the year is dying before it puts on its festive garments. Taking advantage of the beauty of Quebec, the Gaspe Coast and Newfoundland, the Clarke Steamship Company is running two cruises about September 1 that are real bargains. The *S. S. Northland* leaves from Montreal on September 2 for Quebec, the Humber River and Corner Brook, Newfoundland. It will steam through the Bay of Islands and stop at the little interesting fishing villages along the way. The return is by way of the famous Saguenay River, which will be traversed up to Capes Trinity and Eternity. This fifteen-day voyage is listed as an all expense trip from Washington, D. C. for as low as $182.00. A shorter twelve-day trip, on the less elegant *S. S. Gaspesia*, leaves Montreal September 10 and 24 for the Gaspe Coast, Anticosti and Prince Edward Island. It is priced from $85 from Washington.

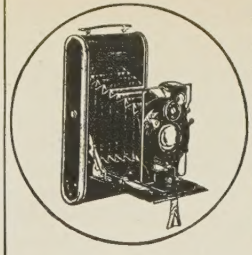
* * *

Washington, incidentally, will be down on everybody's log book during 1932, the Bicentennial year, and now is an excellent time to make plans for your trip to the nation's capital. Besides taking in the elaborate programs being planned for next year, one will wish to become acquainted with the adjoining Old Dominion State, which has more history, old gardens and fine cooks than most any other. The work of restoring Williamsburg, Jamestown and Yorktown, each representing a particular epoch in American history, is proceeding rapidly, and will be completed in time for next year's visitors. John D. Rockefeller and the Department of the Interior principally deserve credit for the fine work being done. Williamsburg, the site of the oldest college (William and Mary), the first theatre, a jail which has been used for 250 years, and the oldest used church, especially should be seen.

* * *

One Washington - to - Washington trip which may be easily made either this fall or next year is a grand-circle tour by way

(Continued on page 137)



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NATURE NEWS and VIEWS

Beavers Exhibit

By the side of one of the highways that run between Portland, Maine, and Montreal, Canada, a colony of beavers has set up a show-place where passersby, without leaving their cars, can see the dam, lodge and activities of the busy little mammals. The beaver-dam is located on Bear River in Grafton Notch, one of the wilder and more picturesque of New Hampshire's rocky passes. The beavers do not seem to be bothered by the passing flow of traffic and permit watching without the usual signs of nervousness. The dam is located on the property of the Brown Company of Berlin, N. H. W. R. Brown, an official of the company, advises that the concern will protect the beavers if possible.

The Beggar Titmouse

A titmouse that became so tame as to take nuts from the hand and to tap on the window-glass when the supply ran low in the bird cafeteria has been adding pleasure to the moments of Barbara H. McKee, wife of the Park Naturalist at Grand Canyon National Park. It was during the past winter, Mrs. McKee writes in the park *Nature Notes,* that the creature learned to come to her hand for pinyon nuts; then one day, he entered the house through the kitchen window to snatch a few from a cup left on the kitchen table. Soon he became so bold as to require the closing of all windows if peace was to be had. His final, and greatest achievement, however, was the habit of tapping on the window-pane when he wanted food. He used to go from window to window until he spied Mrs. McKee in one of the rooms, whereupon he would knock gently, then fly to a nearby tree to wait for a supply of food to be put on the window sill for him.

Connecticut Gets Forest Tract

A 2,000-acre forested area, through which runs the Naugatuck River, has been presented to the state of Connecticut by the heirs of the late Harris Whittemore, for many years a member of the State Park and Forest Commission. This land, known as the High Rock tract, is located near Beacon Falls, and is one of the few unspoiled natural beauty spots in the southern part of the state. Mr. Whittemore began to acquire the land, which he intended later to give to Connecticut, soon after the war. It will be named the High Rock State Forest.

The Age of Trout

How long can a trout live? The question has been partially answered by W. H. Shebley, culturist in charge of the Bureau of Fish Culture of the California State Division of Fish and Game, who raised a Dolly Varden which existed for nineteen years. The fish was hatched in 1898 and died in 1918. It weighed between 13 and 14 pounds at the time of death, and produced during its lifetime, it is estimated, between twenty thousand and thirty thousand eggs. It was, of course, given complete protection, both from human and natural foes, but its long span of life throws new light on the age of trout.

Veteran Entomologist Honored

Dr. Leland O. Howard, principal entomologist of the U. S. Bureau of Entomology and member of the Nature Magazine Scientific Consulting Board, has been awarded the 1931 Capper gold medal and $5,000 for his distinguished service to agriculture in the United States. Dr. Howard, a sketch of whose life appeared in March, 1930, Nature Magazine, is known as "the grand old man of entomology", and his magnificent victories over the house-fly and mosquito and his valiant warfare against the cornborer and the Japanese beetle have made current history. The Capper award, recognizing his half-century of service, specifically rewarded his work in the organization and development of insect control methods.

Wisconsin Commission Upheld

The Wisconsin Conservation Commission, recently under fire, was given a clean bill of health by a special assembly committee investigating it under the terms of the S. J. Gwidt resolution, and its acts praised as honest, intelligent and for the best interests of conservation. All of the charges of politics, waste, inefficiency and negligence were deemed unsubstantiated, and the advances made in forestry, forest protection, state parks, fisheries, game propagation, law enforcement and education were considered to be worth the cost to the state. The committee recommended further funds for forest-fire work, and an additional appropriation of $300,000 for law enforcement. A minority report was filed by one of the five members of the committee.

Rust Enemy Discovered

A fungus that is a deadly enemy to the white pine blister rust, which yearly destroys millions of dollars worth of white pine, has been brought from Germany to join the ranks of the forces mobilized against the destructive parasite. It is *Tuberculina maxima,* and was sent to Dr. E. E. Hubert, authority on tree diseases, by Dr. Karl von Tubeuf, forest pathologist at Munchen, Germany. It will not grow on wood or bark, but attacks only the spores of blister rust. Dr. Hubert has taken some of the spore material to the Elk River district in Idaho where he inoculated several trees. Laboratory experiments are also to be made. If the results of the German experiments are duplicated in this country, the most valuable foe of the rust will have been enlisted in the war to exterminate one of the most virulent pests America knows.

B. C. Reforestation

Although the province of British Columbia has 8,500,000 acres in timber reserves, it is now investigating areas along the coast suitable for the reproduction of Douglas fir. More than 800,000 seedlings will be planted in 1932.

Game Conservation Film

Quail, grouse, wild ducks, wild turkeys, moose, elk, deer, bears and trout and bass, in their native habitats, are leading characters in a new one-reel motion picture, *Forest Fires—or Game?,* recently released by the Department of Agriculture, and to be loaned for the transportation charges to interested groups. This film shows how protected forests provide homes for wild life, and how forest fires and destructive logging methods destroy these homes. The picture was filmed in the mountains of North Carolina and in various national forests and game reservations. Bookings for the film are being made with the Office of Motion Pictures, Extension Service, U. S. Department of Agriculture, Washington, D. C.

Reinforcements for Larch

An army of ten thousand specimens of *Mesoleius tentredinis* Morley, the parasite which preys on the larch case bearer that is destroying large sections of the larch forests in Canada, have been shipped from the Entomological Laboratory at Farnham Royal, England, to join the warfare on the destructive pest. The latch case bearer first made its appearance in the region between the Atlantic and the Great Lakes, but rapidly spread north of the prairies and into northern British Columbia. Experiments with *Mesoleius* in Manitoba convinced authorities that it will be the most valuable ally to the forester engaged with the larch problem yet found.

Jealous Birds

The jealous female pigeon whose actions were recounted on page 65 of July Nature Magazine evidently has her counterparts in the British Isles. The Marquis of Tavistock, a keen bird observer residing in Scotland, writes us: "My gardener once saw a female pigeon come off her nest and attack her mate who was paying attention to another female. The male of a pair of little owls I once kept, though normally a devoted husband, would fall into a violent passion and attack his mate furiously whenever he saw his reflection in a looking glass or whenever his wife started to answer my imitation of the natural call of the species and did not desist when he came to her. Tame parrots are also at times exceedingly jealous."

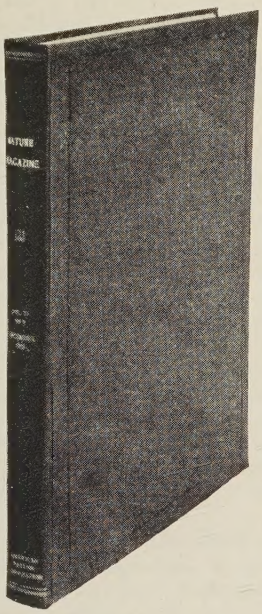
Thrilling Trail Opened

The Ptarmigan Wall trail, one of the most spectacular horse trails in the world, which features a one hundred and eighty-three foot tunnel and a seven thousand foot elevation, is now thrilling riders from Many Glacier Hotel to Crossley Lake camp with the magnificent view it presents. More than seventy-five thousand tons of rock were blasted from the mountainside to prepare it.

Milk and Honey

The land of milk and honey seems to be Canada, according to reports from the Canadian Government Experimental Farm in British Columbia. Tests have been made in feeding bees on milk and sugar, and each milk-fed colony produced an average of 23 pounds more honey than colonies placed on ordinary diet.

UNIQUE GIFTS



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TRAVEL DEPARTMENT

(Continued from page 135)

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The little brother to this cruise is the Canadian Pacific Mediterranean junket which leaves New York on the *Empress of Australia,* February 3. It likewise returns April 8.

* * *

Nature Magazine is always ready to help any of its readers plan their itineraries or make reservations, and will consider it a privilege to inform them as to travel in any part of the world. Address communications to the Travel Editor, 1214 16th Street, N. W., Washington, D. C.

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Why don't you write?

NATURE IN PRINT

Forest Facts for Schools

Under the imprint of Macmillan, Charles Lathrop Pack, president of the American Tree Association, and Tom Gill, forester, have published a text for school use that is admirably adapted to impress upon young minds at the time they receive impressions best, the need of forest conservation and the important principles of tree-planting and care. There has been, for many years, a demand by school officials for such a book to be used for supplementary reading and the authors are the first in the field with a publication which amply fills the requirements of schools in all sections of the country. The book, *Forest Facts for Schools,* is divided into parts dealing with the trees themselves, the forest, forestry and forest practices, forest products, and the many enemies of the forest. Each section is supplied with tests based on material presented, and furnished with a bibliography for further research by the student or teacher. The final chapter deals with the future of forestry and should awaken both pupils and teachers to the seriousness of the situation. The authors say: "But we must begin at once. Already we have waited too long. We cannot delay until the forests are exhausted and then remedy the situation overnight or in a few years or even decades. If we started today full speed ahead, there would still be a time of privation from insufficient forests before these new man-made forests could reach maturity. The first thing to do, then, is to cover our hills with forests again, banish the fire menace, and cut down waste. We must create great areas of perpetual forest to supply our need for wood and for the many varied gifts the forests give." If not adaptable as a whole to the class-room schedule, the book may be used in part in connection with science or natural history departments. It is priced at $1.00 per copy.

P. F. H.

Utah's Wonderlands

Those who have seen Bryce and Zion National Parks have usually returned home to hunt for adjectives to describe the glorious colors and magnificent formations upon which they have gazed. These Utah wonderlands, unique on the face of the earth, bankrupt the ordinary vocabulary. A brave—and successful—attempt to describe the parks, and the adjacent prismatic plains of Utah as well, has been made, however, by Eivind T. Scoyen and Frank J. Taylor in *Rainbow Canyons,* recently published by the Stanford University Press. These two are admirably equipped to write of this region of fantastic shades and weird rock structures. Mr. Scoyen was the first superintendent of Bryce and Zion and grew up in the Utah country. Mr. Taylor is a gifted author with an inborn love of this western land. By word and photograph, they paint an interesting picture, complete even to the geologic and historical background that makes such thrilling reading. The long periods during which erosion and mountain-lifting carved out these rainbow canyons, the era in which primitive man nested on the cliffs and built up an extensive civilization, and the brief but intense period of the Mormon settlement and rule make a part of the story they tell. Past visitors will want this book for the memories it will recall and the additional knowledge it will give; future travelers will find it a Baedecker with a difference. It is priced at $2.

Yellowstone Friends

Everyone who has been exposed to the beauties and fascinations of Yellowstone National Park—and many have—must inevitably carry away an interest in its wild life. Therefore the publication of *Our Wilderness Neighbors,* written by Dorr G. Yeager when he was assistant Park Naturalist in Yellowstone, should awaken memories in the hearts of many. (Incidentally, Mr. Yeager is now Park Naturalist at Rocky Mountain National Park.) After a prefatory chapter on the Yellowstone itself Mr. Yeager devotes chapters to the American bison, mountain sheep, elk, mule deer, moose, pronghorned antelope, bears, grizzly bears, resident members of the cat family, beaver and wolves and coyotes. The book is well illustrated, although we do wish the publishers had given him a bit more white space around his cuts, and the stories are attractively told. It is published by A. C. McClurg and Company of Chicago and at the sale price of $1.25 it should find many purchasers among lovers of the Yellowstone.

He Never Dies

We had thought that nothing more could be done with the life and writings of Henry David Thoreau until Houghton Mifflin sent us for review *Little Essays,* selected by Charles R. Murphy from the works of the Sage of Walden. The little essays have been found scattered through Thoreau's writings and each is a separate entity—charming gems of literature emphasizing again that Thoreau will never die. The essays are taken from the first six volumes of the Walden Edition of the naturalist's writings, these volumes being selected since they are the "Works" as distinguished from the Journals. The book is attractively printed and sells for two dollars.

For Microscopic Hobbyists

For those who have been inspired to examine the world of little things through a microscope a most valuable book has been written by Gerald Beavis. It is entitled *The Book of the Microscope,* and describes the various types of instruments, and the use, pleasure and knowledge to be derived from them. Written without technicalities, it contains explicit directions for all the fields into which the microscope may lead. After a perusal of the chapters on the marvels of coral, pond life, frost and snow, and seed germination one will find it most difficult to restrain from dipping into a new hobby that grows more fascinating with each hour of experience. The book is published by J. B. Lippincott Company of Philadelphia, and is priced at $2.50.

Music of the Air

It was mid the thunder of guns and the horrors of meaningless warfare on the Western Front that Jacques Delamain collected the material for one of the finest bird books to appear this year. More eagerly he sought the few specimens of bird life caught in the tangles of combat than he sought the enemy—though he was a fearless leader and a fine soldier—and the thoroughness of his earlier training, which had raised him to the rank of a leading ornithologist in France, gave him the ability to interpret and analyze what he saw. His book, published under the misleading English title of *Why Birds Sing,* is concerned more with when, under what circumstances, how, where and with what quality these feathered creatures make their music; and his careful observations cast in limpid prose which has been excellently translated, reveal a new world of birddom. This volume has been honored by the French Academy and of it Maurice Maeterlinck has said: "It is a book that I have often dreamed of writing." Although many of the birds are unknown in the United States, yet most of them have close relatives here, and others are denizens of both Europe and America. The American edition is brought out by Coward-McCann, Inc., New York, at $2.50.

Birds and Enos Mills

America of today remembers Enos Mills as the man who showed it the beauties of Estes Park, Colorado, and the national parks of the West, who preached the outdoor life as few have preached it, who built the first Nature trail and who lived long enough to see his fellow citizens trekking westward in answer to his pleas. It hardly recognizes him as a bird man with keen powers of observation and unlimited patience; this was one of the many sides of his unique character for the most part undisclosed. In *Bird Memories of the Rockies,* published this year by Houghton Mifflin Company, this phase of his life becomes apparent, and his wide knowledge of the world of feathers asserts itself. The volume is made up for the most part of interesting tales of his bird friends that gathered near his homestead cabin across the valley from Long's Peak—the baby bluebirds that learned to take walks with him, the jay that tried to be a writer, the goldfinch pair that nested in the alder near the beaver dam. There is little in it not personally observed by Mr. Mills in his solitary hikes and Nature walks. Written with obvious sympathy for the birds in a simple, straightforward style, it ranks equally, if not above, his other published works. Price $2.50.

Life of the Bee

Frank C. Pellett, one of the leading authorities of bee culture in the United States, whose article, "Honey Plants", appears in this issue, has recently published a book entitled *The Romance of the Hive.* It reflects the wealth of wide experience Mr. Pellett's years of study of the bees has amassed, and presents this material in unvarnished, untechnical phrases for the layman and the amateur. One will have a much clearer conception of the high degree of efficiency and specialization the bee has reached and perhaps derive an idea or two on human civilization from perusing this little volume. It is published by the Abingdon Press for $2.

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Seeds—and Students

Interesting hours in the Ohio University Botany Department have blossomed forth into an equally interesting volume, the result of student research in a little-studied field. It is entitled *Seed Dispersal,* and contains a thorough and accurate analysis of the different methods of seed distribution, made by the students under the direction of Professor William A. Matheny, who edits the book. Illustrated by excellent halftones and line drawings, all made by the workers themselves, and containing a fund of information of general interest presented in simple and easily-read English, it stands as a monument to the class that prepared it and to the professor who inspired such valuable work. It is published by the Slingerland Comstock Company of Ithaca, New York.

Natural History Report

The active Eton College Natural History Society has recently issued its annual report, which contains many interesting articles, among them "The Bestiary," by M. R. James, provost of Eton, "The Hoopoe in Sussex" and "Waders in Northumberland." Profusely illustrated by excellent photographs and drawings, and rich in material of interest to all Nature lovers, it presents a fine example of the high-grade Nature work being done by our British cousins in their schools. It is listed at two shillings.

Drought Kills Birds

This year's hatch of waterfowl will be the smallest on record, due to the drought, and the conditions now confronting the wild fowl of North America are the most serious in our history, officials of the Biological Survey announce after a preliminary report of a continental study being made by the Survey in conjunction with Canadian authorities. Serious drought in the breeding grounds of the birds in the spring and early summer this year has accentuated the critical state, and concern for the safety of the birds has increased as a result of Weather Bureau announcements that the extreme deficiency in moisture experienced in 1930 followed similar conditions in the Northwest dating back to 1922. Further reductions in hunting seasons and bag limits appear to be in the offing as one measure of giving relief to the harassed birds. From this preliminary report, which will be followed by a full report at a later date, it is apparent that sportsmen, conservationists and government organizations must lay aside all petty differences of opinion, all selfishness and all quarrelsome tendencies if the present crisis in bird life is to be safely passed.

Blackfeet Serve as Models

Blackfeet Indians on the outskirts of Glacier National Park, in Montana, have been playing a new rôle this summer. They have been posing for a colony of art students brought to the park by Winold Reiss, of New York City, one of the foremost Indian artists in America. Mr. Reiss plans to paint sixty life-size portraits of Blackfeet chieftains, and is arranging a permanent Indian memorial collection to serve as a historical record of the features of the finest types.

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WHAT ABOUT APPROPRIATIONS?

An Editorial

IN THE National Zoological Park at Washington there is a bird that endlessly queries in a grave voice to all visitors, whether solons or not, "How about appropriations?" This bird is neither a native nor a migrant—he is a mynah from the East—but he seems to express the thought of every bird-lover who stops to consider the sad plight of the migratory birds and the way in which the Migratory Bird Treaty with Great Britain is enforced. After all, Congress, what about appropriations?

The Migratory Bird Treaty was ratified in 1916 by the United States and Great Britain, representing Canada, because, as it states, "many species of birds . . . are of great value as a source of food and in destroying insects . . . but are nevertheless in danger of extermination through lack of adequate protection during the nesting season or while on their way to and from their breeding grounds." It established a closed season on certain species, a restricted season on others, and put restrictions on the shipment of birds. Congress passed the enabling act—the Migratory Bird Treaty Act—the day before Independence Day in 1918; the conservationists celebrated the ensuing holiday convinced that the freedom of the air had largely been established.

Unfortunately, however, many species of migratory birds have failed to prosper to the extent together promised by the treaty, the act, and the Department of Agriculture regulations made pursuant thereto. In fact, many species, notably the waterfowl, have so steadily dwindled in number as to raise fears of virtual extermination. These game birds grow more scarce each season. The situation after thirteen years of "protection" is so serious that even sportsmen are advocating reduced bag limits or other restrictions, and bulletins issue frequently from conservation agencies urging hunters to spare the migrant game.

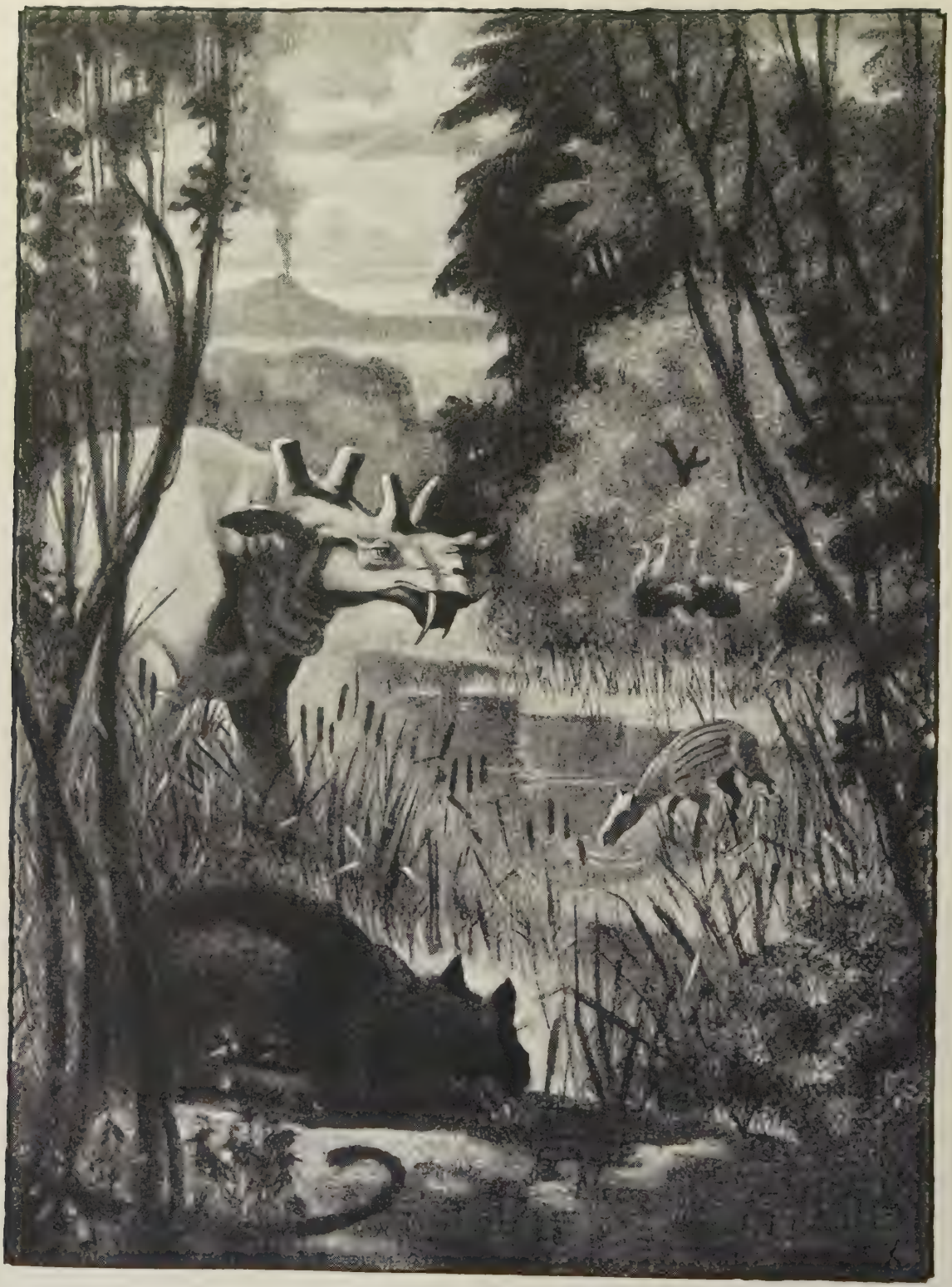
If all those active in reducing the ranks of the waterfowl and shorebirds were genuinely interested in the birds' welfare, their forbearance and influence would make enforcement of laws unnecessary, but with too many their own sport comes first. So wardens are necessary, and wardens cost money—that is, appropriations.

Congress gave $50,000 to enforce the Act in 1918. The 1931 appropriation was but $147,937, or about 4 cents for each of the 3,027,000 square miles of the United States, or about 1½ cents for each of the 9,000,000 hunters. The Survey is able to employ 25 wardens—one for each two states—with this amount, and to hire a thousand deputies for one day each. The wardens, besides covering their patrols, are expected to collect evidence against violators, interview witnesses, appear in court, and write reports. It is evident how little time they have in the field. The wonder is that they manage to get between three hundred and five hundred convictions each year. It is a known fact that the violations run into the tens of thousands.

Enforcing the Act is no picnic. Wardens are often beaten up and shot at; in a number of cases they have been killed. People in certain sections refuse to help, or even are actively hostile; testimony to convict is almost impossible to get. Although the authorities in many states are friendly, in some states they refuse any support. The "grape-vine telegraph" keeps violators informed as to the warden's movements, and the birds have hardly a fighting chance.

It is well-known that the Survey, helpless without adequate funds, has to watch defiance and breach of the law go on without hindrance in many places. In the Illinois River bottoms, for example, ducks killed out of season are illegally sold. In North Carolina, "fire-lighting", or hunting by means of flares that dazzle the birds, has not been stopped. Louisiana marshes are the scene of many slaughters of game birds. These districts are mentioned because the conditions there are notorious. In thousands of places shooting from motor boats, killing protected birds, exceeding bag-limits, hunting in closed seasons, and other of the many possible violations of the Treaty Regulations are daily occurrences. Yet Survey officials say that $500,000 a year would practically eliminate these unsavory conditions, or at least clean up the worst of them.

The day is coming when Congressmen will thunder about the useless slaughter of game birds during the last decade, just as they did about the Teapot Dome oil leases—years afterward. They will wonder why America's migratory game birds were allowed to be exterminated in violation of a solemn covenant with another sovereign nation. They will be told that $500,000 a year would have covered the expenses of 100 wardens, and one hundred wardens might have enforced the Act. They will be told that the same amount of money that would purchase one one-hundredth of a battleship would have insured the protection of our wild fowl. Then, probably, they may wonder why their predecessors in office did not put more serious thought on the question the mynah bird put—what about appropriations?



A PAGE FROM NATURE'S ALBUM
OF TEN MILLION YEARS AGO

Life in an Eocene marsh, as portrayed by Garnet W. Jex—the cat-like animal is about to pounce on the dawn-horse, while the rhino-like mammal and the ostrich-like birds look on

NATURE MAGAZINE

VOLUME 18 SEPTEMBER · 1931 NUMBER 3

"HUH! THEM GEOLOGISTS! HUH!"

A TALE OF DETECTIVE WORK IN THE BADLANDS

BY GLENN JEPSEN

"HI DOUBT," boomed Miss Henry in a cheerful manner, "hif you know what you're talkin' about. Now you beat hit, you! There *must* be hoil 'ere. Don't you think so? Shut up!"

Her remarks need a word of explanation.

We had met bulbous Miss Henry seven minutes ago in the desiccated heart of the desert badlands of western Wyoming, after approaching her withered and deserted-looking shack to inquire about a senescent road which, having writhed through a fever for many miles, struggled up a hill for a last dying convulsion at her door.

We were just about to knock when suddenly at least half a dozen tall, ribby dogs challenged our approach. Numerically they outdid our party of five, consisting of Professor W. J. Sinclair, Joe Page, Jimmy Cooke, both Princeton '30, Sven Dorf, and myself. Only if you attended the experimental performances of the first "talkies" can you appreciate the quantity and confusion of sound that six suspicious hounds can release when they really try.

Although it is true that vertebrate paleontologists are always interested in teeth, our concern had never previously reached such a pitch. Nor, indeed, had canine voices. Our cheeriest "nice doggies" brought only a faint gloating undertone of amusement into the orchestration and increased the total volume beyond all expectations.

THE SOUTH DAKOTA BADLANDS WHERE THE BONEYARDS ARE
And it is no picnic to do geological detective work in country like this. Bands of softer and harder rock give clues to ancient deposits in which the bone-hunter revels

Dr. Jepsen, author of this article, and bone-hunter extraordinary, is but 27, but he has already distinguished himself in his field. His discovery of the shells of dinosaur eggs in Montana last year marked the first American find of that nature. He is associated with Princeton University, and while you are reading this, will probably be sleuthing for more clues to the past in the heart of his beloved badlands

THE "FIND" AND THE FIRST STEPS

Some of the bones are exposed, then carefully shellacked. The paleontologist cannot use steam-shovel methods

PASTED UP FOR PROPER PROTECTION

The whole block of rock is dug out, brushed with shellac and covered with rice paper, then trenched before further work is done

But now, rather abruptly, the tumult subsided to a disgruntled yipping, and we observed approaching a reinforcement which practically doubled the bulk of our ranks. Her proportions were too numerous to be surveyed with a glance. She slowly puffed toward us, having apparently come from the base of the hill where a wheezy, loose-jointed oil-drilling rig shuddered and sneezed in the dusty incandescence. She carried on her back a colossal burlap bag with protruding sagebrush faggots. Obviously thrifty.

"Hello?" I inquired.

"Howdy!" she reverberated.

A practical accuracy showed in the skill with which the sack hurled from her Atlantean shoulders to the spot where one of the sad-looking creatures had stood preparing for an experimental nibble on Joe's shin. But the dog, now two rods away, sat down and grinned at her, then squinted toward Joe, closed his eyes, and swallowed.

"Hi'm Miss Henry," she divulged, and extended a friendly, globular hand. Introductions followed, even with the fauna, which she called "my nice little pets."

"Does this road come to life farther on?" I asked. "We are doing geological work—looking for fossils. Teeth and skeletons."

"No. Geologists. Ummm-m. His there hoil beneath this 'ill?"

"Maybe, but probably not. Does it go up over that ridge?" I pointed to the spot, far in the distance, that we wanted to reach.

"No. Hin that valley hit lies at two thousant feet. You'd better skim out of here, you ugly, rotten-tempered mutt!"

Sometimes I twitch. Possibly I twitched then. I remember picking up my camera.

"Yup, two thousant feet deep now Hi fed you once today go chase coyotes hon the 'ill hin that valley where you see the derrick and shut up!"

Sometimes I wished she might address a whole sentence to either me or the dogs exclusively, instead of leaving the selection of appropriate phrases to their custom and my option.

"Two thousand feet? It doesn't look that deep. Can we get the car down? Is it dim?"

"Can what? His what? Get out, you homely pup. The hoil his two thousant feet down and Hi doubt if . . . ."

"Oh, I meant the road."

Then followed the remarks by which you and Miss Henry were introduced.

"Hin fact hit's like Hi said to Blatz, he's the mechanic for the hoil houtfit hover there," she continued, pointing to a distant rig,

"Hi says to 'im, Hi says, 'Blatz these here badlands must be worth somethin'. You can't raise truck hon 'em and you can't farm 'em and they starve sheep, so there *must* be hoil 'ere,' Hi says. So Hi got this piece of land and Hi'm startin' to drill. Used to run a restaurant but hit don't pay."

She paused for a quick breath, shading from the sun the eye that peered somewhat unsuccessfully from under the bandage which completely covered its mate.

"Don't mind that," she detoured, while I tried to meet her gaze, "my heyes give me lots of trouble until Hi 'ad my teeth hout."

I doubt if the demonstration which followed would have been necessary. "The new ones ain't broke hin yet."

But all this is slightly misleading because I am unable to quote Miss Henry verbatim. Her wealthy vocabulary punctuated itself by methods of expression and improvised sequences that have defeated my sincerest efforts of translation into print.

Her bantering good nature, however, compelled a sympathy with the tenacious spirit that makes "wildcatting" near proved oil fields a perpetual and expensive vanity. She refused, upon no grounds except a hunch to the contrary, to believe her investment capable of disappointment.

Visitors seldom strayed her way, and she soon warmed to confession. "Hi haven't talked much with geologists, and Hi guess you don't know much more than us. Huh! Geologists hought to know there's hoil 'ere."

We tried to explain that our interest in oil consisted mainly in keeping Lucy, the flivver, contented.

"But Hi'd like to give you all a hinvite to stay and 'ave some victuals with me. Mostly coffee, Hi guess."

To my regret we could not accept, and reluctantly we left her, bulging from the doorway of her shack and nodding with a sage, far-off smile, "Huh! Them geologists! Huh!"

The encounter with Miss Henry is a typical part of every chapter, for the most part unwritten, of the life of a fossil hunter.

There was, earlier, the sheepherder who with the aid of gestures tried for three days before he could make us understand his claim to write and speak nine languages fluently. One time, when he was not at home in his sheep wagon and we tried to make a call, we saw a sign on the door. It read, just as he would say it, "PHLIS CHEYP HOIT." This, translated into less fluent English, is "Please Keep Out." His friendliness grew, however,

A SIDE VIEW OF THE FOSSIL ROCK

The rock pedestals are left for support. The entire prize has been wrapped in burlap dipped in plaster of Paris to preserve it

DEATH ON THE DESERT—A RABBIT

Will its skeleton be "turned to rock" and furnish a bone-hunter thousands of years hence the thrill of a lifetime?

THE REMAINS OF OLD TITANOTHERE

Unlike poor Yorick, no one knew him, however, until the geologist went afield. A string of vertebrae is attached to the skull which is at the extreme right

A "CASTLE" WHICH HIDES OLDEST INHABITANTS

Its occupants are not fairy-tale knights, but the remains of animals that lived millions of years ago

and he eventually kept us in a constant state of embarrassment by bringing us leathery cakes of his own construction, and waiting while we labored at them, grinning shyly at our evident pleasure. And he sometimes presented us with rabbits. None of us liked rabbits, — especially in a country of ticks and tularemia. We buried them in a neat row, in clay that contained bones of their ancestors.

"Bone hunting" is an occupation of the desert where only cactus and sage grow. If it were not dry and if the region supported a dense vegetation, there would be no badlands, for they are a physiographic type which develops where the winds are hot and rains are infrequent but torrential.

Camping trips into such areas are like great vital games, — to keep sufficient water in the thirsty arid time (which is nearly always), and to avoid one's washing away when a cloudburst floods down. Desert days are torrid and the spacy blue nights shivery. Necessary precautions influence the equipment. Water is carried in barrels or large cans. Lightness is a factor. Dispositions of the collectors also have to be protected from evaporation and flooding. This is effected by very carefully selecting those who make up the party. But I digress.

A great sediment-filled structural hollow surrounded by a gigantic horseshoe rim of high mountains composes the Bighorn Basin of northwest Wyoming. Inconceivably long ago, millions of decades ago, so the Cretaceous rocks say, the whole region was five or six thousand feet lower than its existing height and presented a picture vastly different from the recent landscape. If any mountains were there, they appeared as islands, because marine waters, perhaps an arm of what we call the Pacific Ocean, covered most of the area. Slowly the whole crust of the earth rose, pulsing up and down; more and more land appeared above the water until the sea was only a memory retained by the fossil record. The present mountain ranges were gradually outlined and slowly, continuously elevated a little faster than the rest of the rising block of the earth's surface we know as the High Plains. Thus, briefly, were the Rockies born.

The rocks of the high places eroded and supplied material, sand and clay, that rivers carried to the lowlands. Volcanoes contributed ashes. Around the edges of the Bighorn Basin the strata were tilted up and languidly eroded down to the granite cores of the mountains. The formations are now exposed near the mountains like the edges of a set of nested dishes. The lower Eocene Wasatch is the top dish, and we see more of it, with its red and yellow and blue figures on its buff background, than of any of the others.

Sand and silt and volcanic ash, which washed and blew into the basin, gradually built up the land along the wandering flood plains of the streams and sometimes buried in it the bones or carcasses of animals which died near the water or drowned or froze or perished by other natural means.

Teeth and bones are the hardest parts of an animal and are hence most often preserved as fossils, for the process of petrifaction is slow and requires special conditions.

WYOMING BADLANDS

When camp is hit. The only water for miles and miles is in the milk-cans in front of the tents

Almost all remains rot, but it is the tiny percentage that find suitable conditions and "turn to rock" that make possible the study of Ancientest History.

Fossil hunters know what kind of rocks to look at for petrified remains. They do not dig blindly in some spot where they "hunch" there will be a specimen. Often an experienced "bone hound" will say of a certain area that is surrounded by productive beds of the same age: "No use searching *there;* it doesn't look right." And the chances are that you won't find fossils *there,* no matter how carefully you look. Much of the field work consists of slowly walking back and forth, up and down, looking for teeth on the badland slopes, or for a bone protruding from a bed through which a stream channel has cut.

Finding a lead, the collector gets busy with his picks and shovels. Not as he would load gravel into a wagon, but *gently,* first brushing the loose surface debris away with his whiskbrooms and small, soft paint brushes. Next comes a coat of shellac to bind the tiny cracks in the specimen and the fragile surrounding matrix. Nearly always the hunter knows from a single protruding joint or section of a bone what part of the fossil animal it came from, but often he wonders what *kind* of beast it might have been,—until he sees a few teeth. Then he diagnoses, "A young carnivore, probably *Sinopa,*" as a physician might say, "Cramps, from those bad tonsils."

As the little excavation exposes more of the specimen, small strips of fibrous lens or rice paper are stuck to the bone with a brush dipped in shellac. Farther in the rock, away from the surface, both bone and matrix are harder and less broken. At last, perhaps several days later, the whole fossil has been disclosed and treated, and a trench is dug around it and under it as far as possible without danger of its toppling off the pedestal so formed. Bandages of burlap dipped in thin plaster of Paris batter are put on and allowed to set. When dry, the plaster jacket containing the prize is turned over and plastered on the base. Then celebrations are in order.

You are probably familiar with the name *Eohippus,* the Dawn Horse. He is well named, for there is little enough about his rabbit size and four-toed feet to suggest the modern hunter. But he changed and grew, through thousands of generations, just as did the rhinoceroses and camels and many others. *Eohippus* is one of the commonest of fossils in the Lower Eocene Wasatch beds. But you can see how rare are complete specimens of all types from this horizon when you know that not half a dozen such have been found. Of these, two or three are *Eohippus.* And then visualize our elation at finding a complete *Palaeonictis occidentalis* skeleton, the remains of an animal that was like a dog, a cat, and a wolverine, but wasn't any of them!

Many other animals shared ancient Wyoming with the early horse, *Eohippus,* and the primitive carnivore, *Palaeonictis.* Small monkeys scampered about near the banks of sluggish streams and shrieked at crocodiles in the water. Dense forests with many hackberry trees thrived. The bird tribe included waders and some gigantic types, over six feet tall, which could not fly with their feeble wings. The last individuals in a long line of a once numerous group called *Multituberculates* struggled to survive but lost out. So did a curious family of large beasts that looked a little like our living hippo. Success was not a matter of size.

The largest land animals that ever lived, some of the dinosaurs, had all died long before little *Eohippus* appeared and announced, "I'm going to be a horse." Not all dinosaurs were big, but great and small alike became extinct in a relatively short time. Their remains have not been found in rocks above those of the Upper Cretaceous age.

Occasionally, besides the actual skeletal remains, the paleontologist finds little "human interest" news items about these creatures tucked in the rocks. Some such social notes are the pebbles they swallowed to help masticate food, their footprints, and the remains of their eggs. Several dozen shells of the eggs have been found in Mongolia and a few fragments were discovered last summer in Montana, which, from the microscopic structure of the shell, seem to be another indelible hieroglyph of the past.

The rock record is full of exciting adventures and mystery, and the deciphering of the fossil Book of the Dead is like writing a detective story. But a well-ordered mystery thriller begins with the announcement that the butler found his master near his desk in the library, at the spot marked X. Fossil hunters don't have an obliging butler to find the body. They don't even have a blustering police sergeant to indicate the proper solution by following the wrong one. There is no smoking revolver, nor even a cross to mark the spot. Bone hunters begin with a blank page, and in each chapter, instead of laughing at a comic relief character, they chuckle at themselves with someone who says, "Huh! Them geologists! Huh!"

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October Nature Magazine will be brisk and colorful, as a fall number should be. Herbert Ravenel Sass returns to its pages with "In the Heart of a Bird." The anonymous authoress, "The Naturalist's Wife", writes up the A. O. U. meeting. A biography of the gentleman with the hot tail, the yellowjacket, is presented by Gayle Pickwell, while Aeolus in his more strident moods is revealed by W. L. McAtee, authority on the winds. Vernon Bailey writes about a fascinating mouse of the West, and Robert Clark shows how Adam Henry was educated. Miss Patten Beard introduces you to a new gardening art—dish-gardening. And there are many other features.

RECORDS OF PASSING WILD FOLK

The completed part of the path forms a gentle S-curve on its way to the bird bath, which is located north of the garage and south of the garden seats in the midst of other walks

DEER AND WILLET TRACKS

The former are at the lower left with the bird tracks going north in concrete. These are truly "footprints in the sands of time," and future generations will be able to enjoy them

A PATH EXTRAORDINARY

WHICH RECORDS MANY HAPPY HOURS AFIELD

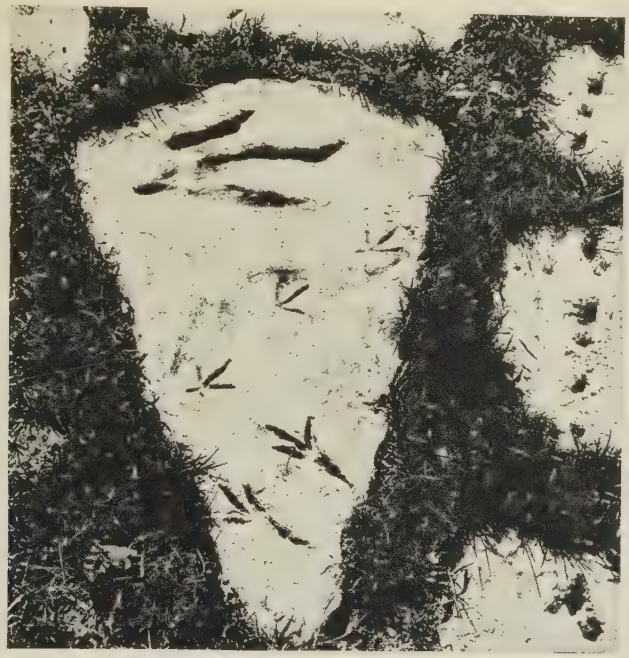
BY HOWARD CLEAVES

PHOTOGRAPHS BY THE AUTHOR

"MAKE TRACKS!" may be an unpleasant command, but not to Charles A. Urner of Elizabeth, New Jersey. For two years Mr. Urner has been making tracks—most remarkable tracks—in the rear yard of his home. He collects tracks and preserves them as others collect stamps,—preserves them in a path which he himself is building unit by unit.

A publisher in New York City, Mr. Urner is at heart an ornithologist—a devotee of the open. When on field excursions to Barnegat—his favorite locality—or to the Newark meadows or elsewhere he carries with him a collapsible, pocket-size stove, a supply of "canned heat" and a lump of paraffin. Spying an animal track on sand beach or mud flat, the stove is assembled, the paraffin melted and poured into the track, provided that track is not already represented in the collection. The imprint left by the animal—be it bird, mammal, reptile or crustacean—serves as a mould. The paraffin, flowing into every detail of the impression, becomes a cast which later is pressed firmly into the surface of a newly laid concrete stepping-stone of the path, thus reproducing the original in a durable medium where all who walk may see.

This remarkable path is a veritable museum of spoorology. Here may be seen the footprints of fifty wild creatures, more than most persons would discover for themselves in the full course of a lifetime; and the collection is ever enlarging. Unlike sketches or photographs, these records retain much of the character of the originals. They have depth, from which may be judged somewhat the weight of the animal which made them. The deep imprint of a deer contrasts with the delicate tracery left by a woodcock. Here a nervous clapper rail has hurried across an open mud flat, thrusting well into the ooze with his middle toe. There a cottontail rabbit bounded away, touching lightly with forefeet and pushing hard with the hind ones. The stroller on this path makes fascinating comparisons of authentic records only



THREE INTERESTING RECORDS

At the top the ostrich dinosaur, then next below, the jack snipe and at bottom, the crow

once removed from the originals. The sizes have not changed, hence no "scales" are necessary. As I studied the various records in the path, from its beginning at the back door of the Urner home to its present terminus, twelve full paces distant, I thought, "What a gold mine, this, for Boy and Girl Scouts and Woodcrafters seeking to learn the natural history of tracks."

On the occasion of my visit to this odd exhibit my host, much to my satisfaction, decided to add two or three blocks to the path for the accommodation of tracks recently captured. From the garage he produced three slender rods which were thrust into the ground as guides for the course of the gentle S-curve of the path.

"This curve," explained Mr. Urner, pointing with the garden spade, "will bring the path into a line parallel with the privet hedge and thus, eventually, to the rear of the yard and . . . "

"The path," interrupted the calm voice of Mrs. Urner from her hitherto unnoticed position at the back door, "will proceed as far as a point in line with the front of the garage. The yard beyond that line is mine and for my own planning." And the publisher's wife disappeared from our view in business-like manner as if she had merely finished correcting a defective manuscript.

"If the worst should actually happen," smiled the man with the spade, "I can always build a nice boomerang-shaped side path out around that apple tree."

Whereupon he began to dig. A roughly rhomboidal section of sod was cut and the soil beneath it removed to a depth of fifteen or eighteen inches. Medium-sized stones were brought and chinked into this small pit, and finer ones brought the surface to within perhaps three inches of the level of the lawn. These final inches were now filled with newly-mixed concrete, smoothed and leveled with a sort of long, limber putty knife. The

WOODCOCK AND DEER FAWN

The arrow-shaped tracks are those of the bird, the holes are its borings, and the deeper tracks belong to a fawn. This path is unique in the annals of home decoration, and is a real education

BLACK BEAR AND GREATER YELLOWLEGS

Which is which is obvious but on the slabs at the left the snapping turtle has left its records. Mr. Urner has got most of his tracks in New York and New Jersey

A MUCH TRAVELLED SECTION
Extreme upper left, the barn owl; strong impressions in center, the cottontail; lower right, opossum

paraffin forms were next carefully placed and "settled" into the concrete, then guarded by board frames against unwanted tracks of neighborhood cats, dogs and possibly humans, and left to set over night.

Observing the evident satisfaction that my friend derived from his hobby I wondered if by chance he might not, years ago, have been one of the youngsters said to have made tracks in the professor's newly laid sidewalk. The professor was fuming and inveighing against the brats when a neighbor called to him, "Why, Professor, I thought you liked children." To which the professor replied, "Yes, I like children all right. I like them in the abstract but not in the concrete."

"Do you collect all of these tracks yourself?" I asked Mr. Urner.

"I have taken most of them," he answered, "but several, including two or three of the very best, have been contributed by my devoted friends."

So saying, he led me to a point about half way along the path and pointed out a robust imprint which might conceivably have been made by a human foot of queer shape.

"That," he said, "is a bear track secured for me in New York State by a friend who is on the staff of the American Museum of Natural History. The original was in snow, which made it impossible to work by the hot paraffin method. The paraffin would melt the snow, causing the track to lose much if not all of its character and form. In place of paraffin he used plaster of Paris heavily impregnated with common salt which causes the plaster to set almost instantly. Here," he continued, leading me to a section a few paces from the bear track, "is another footprint found in snow. It is that of a gray fox, a resident of Westchester County, New York. The cast was secured for me by the same friend who contributed the bear track."

"Which do you consider to be the greatest rarity in your collection at present?" I asked.

"That," after some deliberation, "might prove a matter of opinion and taste. Here, for example, is a weird track probably rarely seen by anybody, yet made by a not uncommon bird. It is the foot record left in soft mud by a barn owl. What that owl was doing ambling along on a muddy shore I have never been able to guess. Yet the record is unmistakable for the reason that no other bird, at least of that size, possesses a hind or fourth toe so placed."

Pointing out a rather small print which revealed clearly that the author of it was web-footed, my guide remarked, "Considering the scarcity of that bird for some years past I suppose its track might be regarded as rare. It is the record of a wood duck. I know because I saw him make it."

Indicating a big, kite-shaped block bearing three very different types of tracks and singling out the largest of these, Mr. Urner said, "There is a rare one, perhaps the rarest of the lot, judged by the usual standards. The original was recently discovered in sedimentary rocks

MR. URNER AT HIS HOBBY
Here he is carefully pressing the paraffin forms into the soft concrete

here in New Jersey by a paleontologist, a professor in one of our leading colleges. It is a footmark left by an ostrich dinosaur which roamed these parts quite a few seasons ago."

"How," I inquired, "do you make certain of the identity of all of these footprints?"

"Well," replied Mr. Urner, "in the first place, as you know, all of us are familiar with the commoner tracks—just as familiar as we are with every-day objects like cigaret stubs, apple cores or automobile tire imprints. I need not see a crow, rabbit, squirrel, herring gull, deer, raccoon, muskrat or mink to be sure of the identity so long as the foot record is a clear one. On the other hand there are tracks which might well cause a bit of head scratching if seen for the first time and in the absence of the responsible parties. Among these might be listed the tracks or trails made by the king crab, snapping turtle, painted terrapin and opossum. The majority of tracks in my collection I have seen in the process of making, which renders identity certain. Such first-hand observation is especially to be desired in the case of shore bird tracks."

I could well imagine the avid collector, paraffin and stove held at "half cock," stalking the timid wild things and maneuvering them toward impressionable surfaces, then rushing forward to capture their footprints.

"A glance at any of these imprints," remarked Mr. Urner as we moved slowly along the path after his job of installing the new units was completed, "is sufficient to bring vividly to recollection the adventures and observations of a lifetime pertaining to each and all of the wild things having representation here in this little path. These tracks are reminder notes such as a debater or a lecturer might use in developing a theme, except that in my case each association is of the pleasantest, most satisfying and personal sport. Take that lacework of shore bird tracks there as an instance; and these bold strokes left by a great blue heron. They enable me in a flash to see the far-reaching, horizontal lines of Barnegat Bay, the dunes and bayberry bushes, the blue and white of the Atlantic out beyond. Behind me and to right and left stretch the broad, green, salt meadows. A fish hawk wings inland, a menhaden flashing in his strong talons. Near the mouth of a creek a hundred yards to the north is the gaunt form of a great blue heron stalking mummychugs. The tide has ebbed, exposing broad belts of mud where swarms of sandpipers and plovers chatter and scamper and probe for food in the marginal muck with their skewer beaks. There is frenzied activity. To see this square foot of concrete with the maze of toe marks etched clearly on its surface is to re-live, in a measure, many joyous hours afield. In this way the path which I am constructing, little by little, here in my yard is far more than a path. In addition to being a good thing to walk on, it gives me healthful exercise in the building of it; some ingenuity

PREPARING THE NEW UNIT

Small stones make a base upon which the concrete layer is poured three inches thick

A VARIETY OF RECORDS

The parallel lines are the tracks of the painted terrapin, and at the lower right is a print of the great blue heron made in the mud

is evolved in the course of planning the details; and, best of all, it is a durable, ever-present reminder of priceless moments spent in companionship with the makers of tracks."

Notebook in hand, I walked this concrete trail from beginning to end and copied its amazing record. Here are the creatures who had crossed and sometimes recrossed it:

Egret, greater yellowlegs, spotted sandpiper, raccoon, lesser yellowlegs, wood duck, herring gull, Virginia deer, laughing gull, willet, little blue heron, sanderling, killdeer, turnstone, gray squirrel, great blue heron, solitary sandpiper, black-bellied plover, painted terrapin, knot, crow, jack snipe, ostrich dinosaur, mink, clapper rail, black bear, snapping turtle, muskrat, king crab, common tern, piping plover, gray fox, fawn, barn owl, woodcock, dowitcher, black-crowned night heron, semipalmated plover, least sandpiper, cottontail rabbit, black skimmer, snowy egret, and opossum.

This writer feels the impulse to go back each year to see what additions have been made to this unique path. Especially does he wish he might be present to see what happens when the path in its growth finally arrives at "a point in line with the front of the garage."

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BANDING THE BABY LOON

THE EXCITING ADVENTURE AT SUNSHINE CAMP

BY D. GORDON COX

BRAVELY HE SET OFF
Breasting the waters of the harbor, he calmly started out to sea

"HEY, there's a goose sitting on the beach."

The yell of the Small Person, one of the smallest persons, in fact, in the whole of Sunshine Camp, brought the entire party of children who were investigating the beach on the run. Faster than they came the Camp Mother, however, and she it was who just escaped when the "goose" suddenly went into action, unbent its long neck and thrust out its bill with lightning speed. Here was no goose! The bird was a baby loon.

Then followed the great adventure of taking the creature prisoner. At last it was done, with the only cost being bleeding fingers, and the eager procession turned campward, preceded by many chubby young heralds who felt it their duty to dash ahead and tell mothers all about it. Finally the Office was reached, and the bird, now the center of a hundred eyes, calmly squatted on the floor. Its only marks were bleeding toes and rumpled wing-feathers, evidently gained in trying to reach a high dry place to sleep. All sorts of measurements were taken while the darting head was safely covered with a bathrobe, and then a band was adjusted to his queer flat leg. Still resisting, he was carried to a place on the grass, then sat like a statue for his picture.

But most of all the children wanted to find out if he could swim. So away to the beach, where the bird was carefully placed at the edge of the incoming tide. Suddenly he came to life! Bravely he set off into the unknown, now and then treading water in an effort to arrange his rumpled plumage and to show to the admiring crowd an expanse of snowy, silken breast and underwings. At length he passed from the view of his young and grown-up friends.

POSING ON THE LAWN
As if proud of his strange beauty, the young loon squatted motionless for his picture

But he was not gone. For weeks he stayed in the harbor, sleeping on the Spit each night on almost the same spot. He was often pushed gently into the water, but never showed fear. True, a stranger who tried to pick him up got a kiss on her cheek, and it was only the youth of the bird and his poor aim that prevented the loss of an eye.

Only once did the youngster call his weird, wavering cry. The wind was blowing across the harbor, and in less than twenty minutes a pair of adults had come several miles from the farther side—were they the parents coming to the rescue? But evidently nothing was amiss, for young and old passed on the water and the adults soon returned to their usual haunt.

It is now another summer since the loon of Sunshine Camp came to thrill the children and their mothers. Will they meet him again this year? We wonder. If anyone reports the existence elsewhere of No. 301306 we will know we shall never see him again at Sunshine Camp.

OVER THE SHALE
No slope is too steep for the goat

THE MOUNTAIN GOAT THAT IS NOT A GOAT

BY VERNON BAILEY

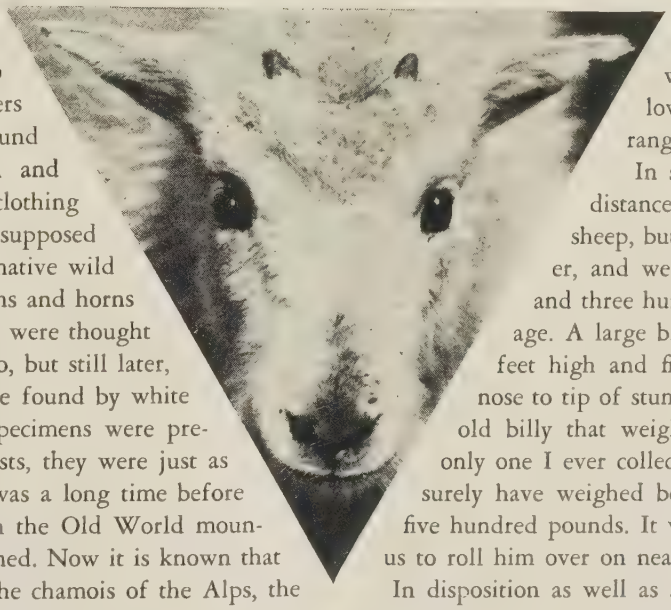
CHIEF FIELD NATURALIST OF THE BIOLOGICAL SURVEY

PHOTOGRAPHS, UNLESS OTHERWISE CREDITED, BY WILLIAM L. FINLEY

DOWN THE CLIFFS
Few animals have such sureness of foot

This is the first in a group of articles on North American mammals. This series is designed to present material of outstanding permanent value on the lives of these mammals and to provide in terse and readable form the existing information about these wild races now known to mammalogists. Many of them will be specially prepared by Vernon Bailey.

THE WILD animals and wild peoples of North America were closely associated before the white civilization swept both aside without stopping to realize that neither was half as wild as it was made to appear. The early explorers of our Northwest Coast found among the natives warm and beautiful blankets and clothing made of a soft white wool, supposed to be from some kind of native wild sheep. Later, when the skins and horns were first seen, the animals were thought to be goats or white buffalo, but still later, when the live animals were found by white men in 1811 and when specimens were preserved for study by scientists, they were just as much of a puzzle, and it was a long time before their true relationship with the Old World mountain antelopes was determined. Now it is known that their nearest relatives are the chamois of the Alps, the goral of India and the serow of Japan. Their bearded chins, slender horns, and solemn faces, however, have fastened to them the name of goat; and mountain goat, or white goat, they have been and always will be called in spite of anatomical characters and actual relationships.



In habits as well as in general appearance these animals are goat-like. They have been famous climbers of dizzy cliffs and peaks for such long ages that strong feet and muscles, woolly coats, and steady nerves have been developed to fit them for a life on the crags. They have heavy hoofs with rock-clinging surfaces, wear rubber heels and carry on each foot two well-developed and fully functional secondary hoofs to use in case of a misstep or as extra brakes on a steep trail; also they have low bodies, short legs, powerful muscles and a heavy fleece of long coarse hair and dense soft wool, warm enough to keep out the most bitter cold. Even the long yak-like hair of legs and belly and chin shows an important adaptation to a bed in the snow when the temperature goes down to sixty degrees below zero. Only the polar bear, musk-ox, caribou, and mountain sheep are equally equipped for the cold and the last two named, with neither wool nor fur, usually seek lower and warmer winter ranges.

In size the goats appear at a distance no larger than mountain sheep, but they are lower and heavier, and weigh between two hundred and three hundred pounds on the average. A large billy will stand about three feet high and five feet long from tip of nose to tip of stumpy tail. Seton records one old billy that weighed 502 pounds and the only one I ever collected for a specimen would surely have weighed between four hundred and five hundred pounds. It was hard work for two of us to roll him over on nearly level ground.

In disposition as well as structure they are adapted to their chosen habitat. Phlegmatic to a degree often called stolid, they prefer to brave the elements rather than compete with rivals or match wits and horns with numerous enemies lower down. On their cliffs they have a comparatively safe and quiet life with little to stir them to nervous energy.

In the Bitterroots of western Montana in August, 1911, I had a good illustration of goat nature. An old billy, a young billy, and a yearling were seen coming from another peak across to my ridge above timberline. They were not hurrying, and I had plenty of time to hide close to the trail along which they were coming, but as I had no camera my only object was to see how close they would come and learn what I could of their ways. They climbed the last steep slope and quietly wound along the trail to within a few yards of me before catching a foreign odor and halting to sniff the air. For a few moments I watched them without making any motion and noted the winter fleece of the old billy hanging

in great tufts and rags from his half-molted sides and revealing large patches of the short white summer coat underneath. The coat of the younger billy was ragged but less molted, and that of the yearling was soft, white, and woolly. As I watched they got more and more suspicious of danger, however, and to test their speed and quickness, I made a run to see if I could pull out some of the superfluous wool from the sides of old billy before he could get started. It was a close race, but I missed him by a few feet, and he soon outdistanced me.

The goats are not swift runners, as they well know, and are at great disadvantage among carnivores on level ground. They are not aggressive and rarely make any show of self defense unless forced to it, although savage and even fatal fights are said to take place at times among the old males.

In 1924, two young women, members of a Sierra Club party to Glacier National Park, had the exciting adventure of meeting an old billy on a narrow ledge well up toward the peak of Mount Wilbur. He would not leave the trail; in fact, he could not do so without coming past them, and they could not proceed to the coveted peak without going past him. All hesitated and did some watchful waiting and thinking. The very difficult and dangerous peak had been climbed the day before by a few of the best mountain climbers of the party, and these girls were not going to be outdone by the men or be held up by a mere goat, so they quietly and slowly advanced, keeping the cliff side of the trail and actually squeezed past the big billy and went on up the peak while he returned to a lower level. Evidently he had not expected any other animal than a goat to attempt that all but inaccessible ledge and was glad to make a friendly compromise as to right of way.

Long before Glacier Park was thought of as a park I watched an old goat and her young kid on a little shelf near the Sexton Glacier on the side of Going-to-the-Sun Mountain. The kid was lying down and the mother standing close against the sheer cliff at one side of the great glacier front. Suddenly a mighty roar took my attention from the bear track I was following and fixed it on a cloud of ice spray rising from below the glacier as tons of ice broke loose and thundered down the sides of the mountain in a roaring avalanche. It shook the ground where I was, half a mile away, but the old goat at the very edge of the ice-smoke paid no attention and the kid did not get up. Who could but envy the even temper of their nerves?

Mountain goats are good climbers, strong and not afraid, but any experienced mountaineer can go where they can. From below it often looks impossible, but I have followed many of their trails up cliffs that from below looked like castle walls and always found foot room and a way to get from shelf to shelf. The great advantage of these high cliff shelves to the goats is that no carnivore dares to attack them there.

They have many enemies, chief among which are man, coyotes, wolves, bears, wildcats, and eagles. In national parks where man is now the protector instead of the destroyer of mountain goats, the prowling coyote and the more powerful timber wolf still get a few when they come down at night to feed in the alpine meadows, as shown by the goats' wool in the dropping of these animals along the trails. Grizzly bears have been found

ON THE DOWN AND DOWN

A moving picture strip shows the ease and grace with which a goat descends a cliff

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A YOUNGSTER REFLECTS

This picture strikingly shows the thick winter coat against which no winds prevail

T. J. HILEMAN

THE EMPEROR OF THE OPEN SPACES SURVEYS HIS DOMAIN

And old Billy, still wearing his winter coat in June, stands as sentinel over the rocky peaks of Glacier National Park, Montana

feeding on goat carcasses at timberline in early spring but possibly only as scavengers rather than killers. Occasionally mountain lion and Canada lynx tracks are found up close to the goat ledges, and it is a fair assumption that these big cats sometimes feast on the animals as they do on mountain sheep and deer at lower levels.

Of necessity the goats must come down from the high rocks where they spend the day to feed at night in the little green meadows, and here lies their danger. Perhaps they would stay in these meadows if not alarmed, but at the first sign of an enemy they rush to the cliffs and are soon again on safe ground.

Eagles are known to kill, carry off, and eat the young kids before they are large enough to defend themselves, although the mother goats are generally able to protect their young against such attacks. W. T. Cox describes an encounter between an old goat and an eagle that was trying to steal her kid which he witnessed in 1907 when in the Forest Service. He was traveling with Joe Causley on the ridge south of Mount Cleveland when he was attracted by the strange actions of an old goat that frequently bounded into the air. Working his way up the slope to a better position he discovered a young kid lying on the rocky shelf and a great white-headed eagle swooping at it from above, while the mother goat with sharp spiked horns met each swoop with an upward bound and thrust that effectually turned the bird aside. Again and again the eagle soared and swooped down with savage talons held ready, but each time was met in the air by the sturdy mother goat, ready to risk her life against any enemy in defense of her young. Finally discouraged, the eagle gave up the battle and soared away to find some unprotected kid, fawn or marmot for his waiting young, while the mother goat hurried her kid to a sheltered niche in the rocks well hidden from soaring eagles.

On another occasion Mr. Cox visited the nest of a pair of eagles on a cliff north of Sun River, Montana, under which he found remains of a young goat and two young mountain sheep. There are also other records of the young goats being caught, carried away and eaten by the eagles. That the danger is real and that such tragedies are not infrequent are shown by the habits of the goats.

Watching the upper slopes of Going-to-the-Sun Mountain with binoculars in the late afternoon as the moun-

"WELL, WELL, WHAT'S THIS?"

A curious pair eye the camera, unafraid and sure of their powers of escape

tain shadow crept across the terraced slope far above timberline, I have often seen the well-grown kids of midsummer appear, one after another, from little caves and holes in the rocks, where they had been safely concealed during the bright light of the day and join their mothers grazing nearby, keeping close for protection as if they felt danger from enemies lurking above or below.

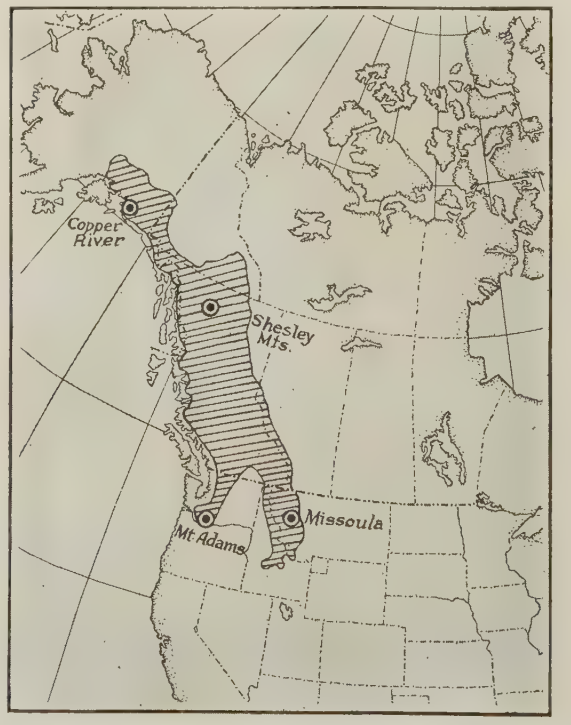
Low-browed and stolid as the mother goat may appear, her watchfulness, care, and affection for her young are just as evident as the finer and more demonstrative mother love in the higher types of the animal kingdom.

To see a mother goat climbing the steep chimney cracks of the Garden Wall above Iceberg Lake, scrambling across sliding talus, leaping from shelf to shelf up what appeared to be a sheer cliff, and followed by a wobbly-legged kid only a week old has thrilled me with wonder and admiration. Some of the steps and shelves were so high that the kid would make repeated efforts before gaining the top and then, panting for breath, brace its legs for the next effort, while the mother looked calmly down from her shelf above. She would go only so far and then wait and watch the progress of the little one, never hurrying it and always picking the easiest way for it. Finally, at the top of the difficult pass, she stood on a safe ledge until the tired young was able to come up and enjoy a well-earned lunch. Abundance of food, a safe and shady shelf for herself and her little one, freedom from fear and care—what more could a mother goat ask for perfect happiness!

In two of our great National Parks, Glacier and Rainier, with no hunting and a partial control of the predatory animals, the mountain goats show a steady and most gratifying increase. This means that the goat pasture, the high crests of the parks, will soon be fully stocked and the goats will destroy their own range and starve if the increase is not checked or the surplus removed. Control measures may be effected to some extent by pushing the goats out to neighboring ranges not now occupied by them, but this may prove difficult. Trapping in corral traps and shipping to other ranges and other parks for stocking will relieve the pressure for a time. Some of the peaks in and around Yellowstone Park, as well as in the Tetons and Wind River Range south of it, are perfectly adapted to mountain goats that would add much to the attractiveness of these scenic ranges. Even the Wasatch, the Uintas, and the Colorado peaks would be good goat country and could be easily stocked from the surplus of Glacier Park. Farther west the high peaks of the Cascades in Oregon—Hood, Jefferson, Three Sisters, Diamond, Thielson, Scott, Mounts Mazama and McLoughlin (Pitt)—could be stocked from the surplus of Mount Rainier and an attractive form of native life be given a wider range. The advantage of thus extending the range of the mountain goats is that they occupy a habitat rarely used by other game or grazing animals.

As game animals, mountain goats have little attraction to white hunters except for an occasional trophy. In fact, an old billy goat has the toughest, blackest, rankest meat that I ever tried to eat except that of a golden eagle, and the two were very similar. The Indians and many white hunters are fond of the meat of young goats and I am not sure that proper cooking might not reduce a roast of any old billy to an edible condition. The natives in the goat country have always hunted goats for the double purpose of supplying food and warm clothing. Generally the goats are too tame and easily stalked to afford an attractive sport; the principal excitement lies in the difficult climb to their lofty peaks, and this one can do without shooting the animals.

Whether they could be brought into domestication and serve a useful purpose for meat or milk or wool has not been tested, but from their naturally gentle dispositions it would seem entirely possible to domesticate them. The Indians often kept the young as camp pets but apparently for no very definite purpose. Until we do tame and study them in an intelligent manner there will remain a dense ignorance of their habits, natures, and possible adaptations. Who knows but some day they may be the faithful cows of the Arctic dwellers?



THE LAST STAND OF THE GOATS
The shaded portions show their general range. Type localities of the four sub-species are shown by the circles

The natural food of mountain goats evidently covers a wide ange of native vegetation. Little alpine meadows rich in native clovers and such leguminous plants and timothy and other short rich grasses are the favorite summer pastures, but the dry slopes above the meadows and up between the snowbanks carry many succulent or half-woody plants with big meaty roots just under the ground. Some of these show the effects of grazing in summer, but what about winter? When the deep snows come and the sheep and deer and elk go to lower levels to browse and graze the goats go up instead of down and feed along the

crests of wind-swept ridges, where the snow blows off and leaves bare ground with frozen plants and shrubs and roots to be picked and browsed and dug. It is a hard, dry fare, but seems to keep the goats in good condition while the high peaks afford safety above the zone of deep snow on the timbered mountain sides.

Those captured and tamed have shown good appetites for clover, hay, grain, and such food as any goat should relish. In many cases the young have been raised on both fresh and condensed milk until old enough to eat rolled oats, grain, and hay. There should be no trouble in raising or domesticating them in any cool mountain climate, and who knows but a white goat ranch might prove more profitable than some other stock ranches?

The white goats, or mountain goats, are known only in the mountains of northwestern North America: from the southern Bitterroots of western Montana, the Sawtooth Mountains of central Idaho and from Mt. Adams and Mt. St. Helens in the Cascades of Washington north through the Cascades and Canadian Rocky Mountains to Alaska. They live generally along the crests of the higher ranges but in places in Alaska come down to sea level where the vegetation suits their diet.

Four forms have been described by various authors, but sufficient specimens have not been brought together to determine the relative value of the characters assigned to each or to outline their respective ranges. The type localities follow:

Oreamnos americanus americanus, described by Blainville in 1816, ranges from the Cascade Mountains to near the Columbia river in Washington or Oregon, according to Lewis and Clark expedition reports. In Alaska, from the mountains to near the mouth of the Copper River, *Oreamnos americanus kennedyi* dwells, while *Oreamnos americanus missoulae* occupies the mountains north of Missoula, Montana. The fourth sub-species, *Oreamnos americanus columbiae,* identified by Hollister in 1904, ranges among the Shesley Mountains in northern British Columbia.

Few mammals have won as firm a friendship among outdoorsmen as the mountain goat. His nervelessness, his stolidness and his sure-footedness on crag and rock have earned the respect of all those who recognize achievement in whatever form it appears. And it will be many generations before the phrase, "he can climb like a mountain goat" will cease to be the highest praise possible to give to a mountaineer with courage and agility.

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R. C. COLLING

AND THE ARISTOCRATIC PERSIAN BROUGHT THEM UP

Madame Silver was of nobility, but when three baby possums, bereft of home and mother, were brought down from the California mountains by a mere man who sought to save them with the bottle, she rose to the occasion. With a new family herself, Madame Silver merged them in with her own children and nursed them to young possumhood, never thinking of the meal they would make. Then one day, having their fill of food and mothering, the three took themselves to the woods, to live their own life. R. C. Colling of Hermosa Beach, California, brought the maternal heroism of Madame Silver to our attention.

THE OAK LEAF BERRY GALL

It is shown variously on an aborted leaf; on early blossoms and leaf; and cut open to reveal the single larval free cell, which, below, is enlarged to disclose the pupa within. At the lower left are three galls on one leaf, and at the right the gall wasp proportionately enlarged. The galls are natural size

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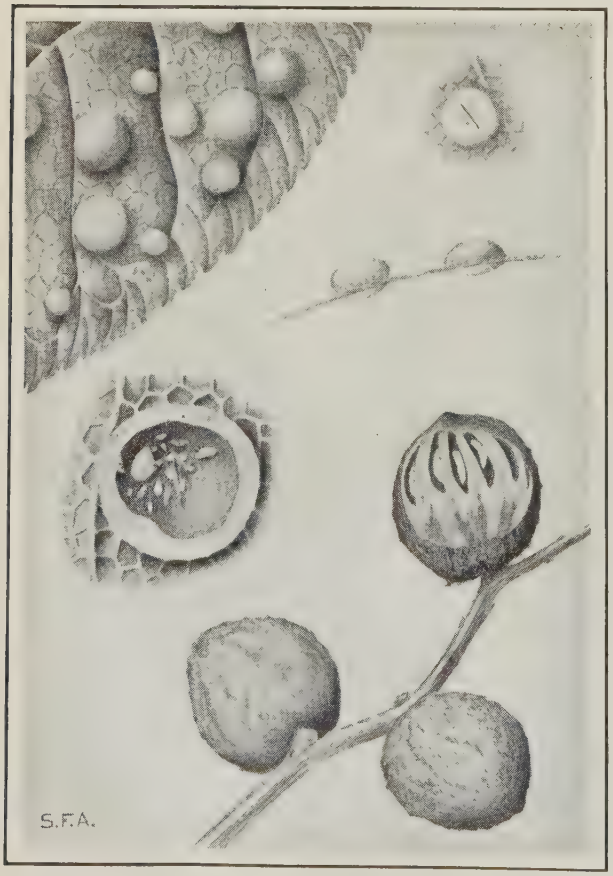

THE LITTLE WONDER FLIES

BY S. F. AARON

ILLUSTRATIONS BY THE AUTHOR

THROUGHOUT the wide realm of Nature there are countless mysteries that apparently no amount of investigation will completely divulge. To some there is a certain charm in this, a peculiar contentment in being mystified, but the scientist generally wants to know the why and the wherefore —to find an explanation for every fact concerning the means whereby all growth is generated and continued and the methods by which special types have attained peculiarly governed developments.

Among the strangest, most inexplicable processes of Nature are those odd growths on vegetation called galls made by the little insects that utilize these growths,—the gall-flies.

First thought would regard these infestations as no more remarkable than the mud or paper cells of various hornets and wasps which are objects of workmanship. The galls are merely growths influenced only by acid injections. But notwithstanding this simpler distinction the latter present by far the most remarkable phenomena in cause and effect.

In finding means to protect the young of her surviving children the Old Mother knows hardly a limit; come what may she must take care of her helpless little ones of all kinds. The building of nests of a wide variety by a host of species, great and small, both vertebrate and invertebrate, is a means remarkably efficient; cocoons and larval cases are thus related. Camouflage and the possession of deterrent odors are common and by no means useless; bold, unyielding and armed defense, as with the stinging Hymenoptera, is successfully practised. But most effective are the peculiarly induced growths that serve as fortressed domiciles and means of food.

Oaks are the principal mediums upon which the gall insects practise their art of superinducing growths that are abnormal as far as the natural formations of the trees may be considered. Perhaps these trees are more easily influenced, though several others show infestations, as the walnut, maple, hackberry, elm, cottonwood and, notably, the hickories. Some smaller, woody species suffer also, as the blackberry, wild rose and grape; also a few of the endogens, among them the wild asters, goldenrod, ironweed and joe-pye weed. So familiar are the galls on oak that when we speak of these growths we commonly think only of oak galls.

The pin oak, scarlet oak and white oak are most often

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PHYLLOXERA GALLS ON THE HICKORY

At the top is shown the gall on a leaf, the slit through which the winged form emerges, a side view of the galls on a leaf section, and an enlarged cross section revealing the brood. Below are the apple-shaped galls of midge on grape

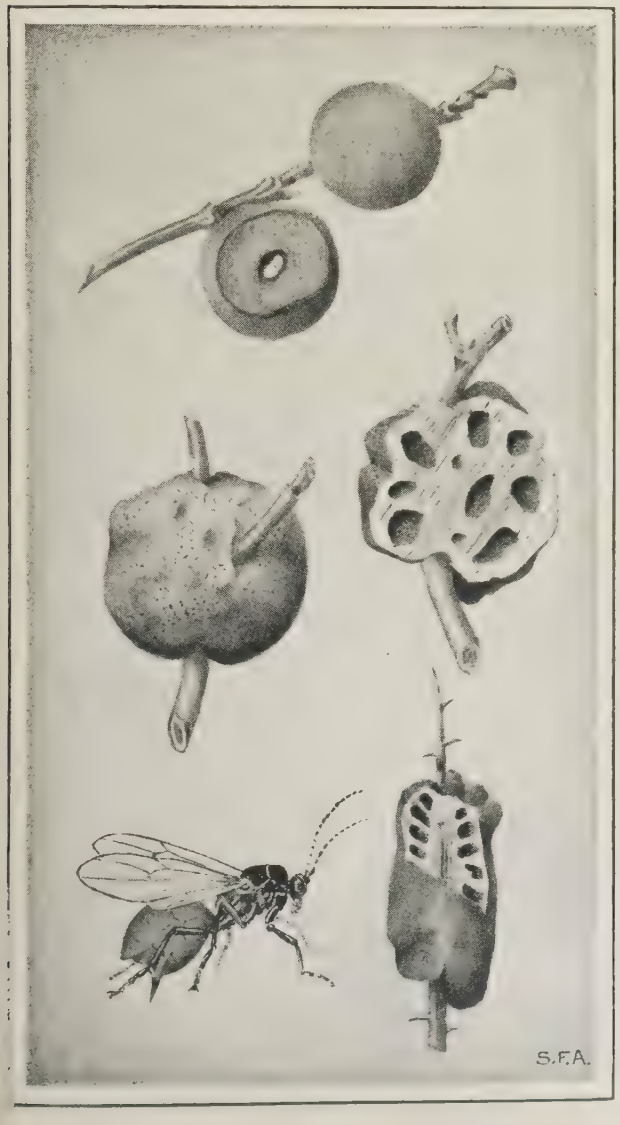
THE OAK APPLE GALL IS HANDSOME

Children often mistake it for an edible fruit. The lower drawing reveals the radiating rays that support and doubly protect the single inmate at the center. About natural size

infested by the gall-makers. Some species, as the little black-jack, the bear and the post oak, seem to be almost immune. Many species of plants in general are never thus infested.

There are three principal kinds of gall-making insects: the gall wasps, *Cynipidae*, of the order of Hymenoptera, the gall midges or gnats, *Cecidomyiidae*, of the order of Diptera, and the gall-making plant lice, *Aphididae*, which belong to the sub-order Hemiptera-Homoptera. Others of less importance are among the beetles, the flea lice and certain two-winged flies.

To say that one of these groups is of more interest than the others is merely to challenge the preferences of any specialist who makes the study of an order or family his hobby. The Nature lover is curious about them all. The gall-wasps, however, from their sprightly ways and the beauty of the growths they cause, are often the first to attract attention and they have received more of it than the smaller aphids and midges, with the exception of the serrate cockscomb galls on the elm, the work of *Colopha ulmicola,* a gall aphid which has been much studied.



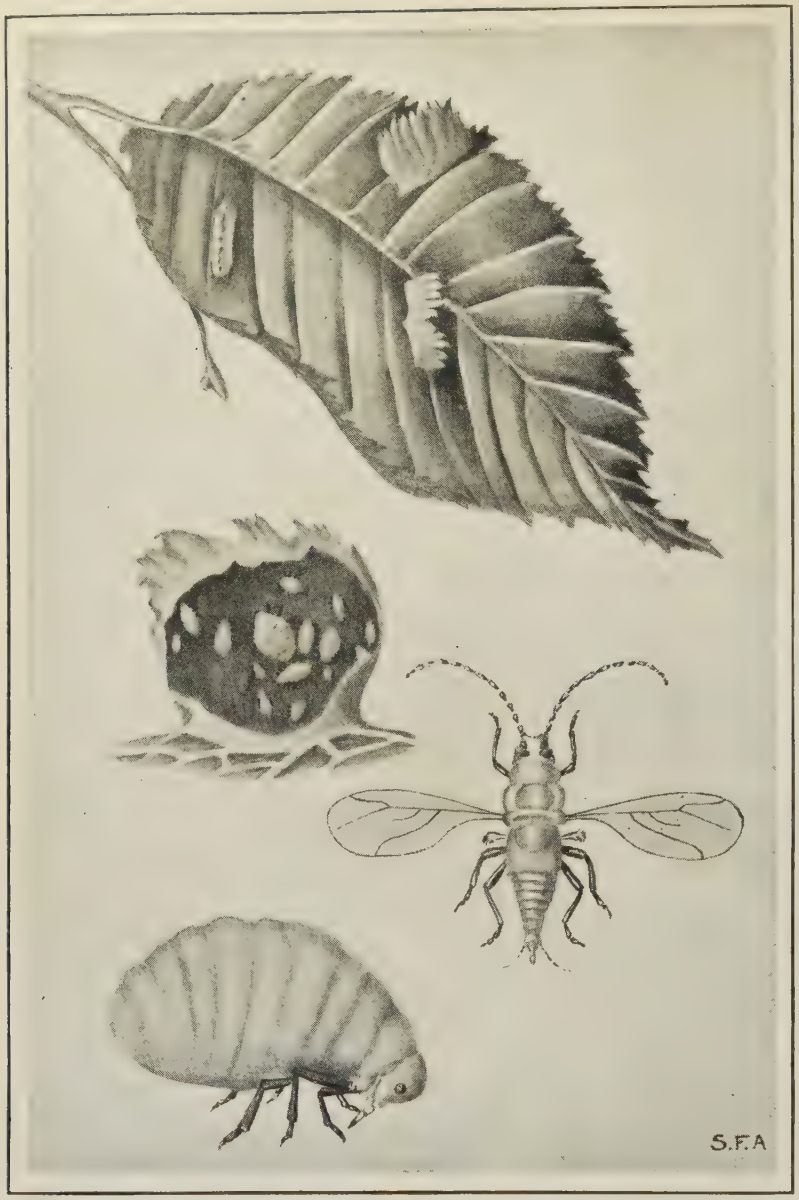
Worthy of the deepest investigation as a subject of pure science is the actual cause of these galls,—the strange influences that bring about such remarkably varied growths. The life histories of the different species vary in detail: minutely among those of the same order and considerably between those of different orders. Within general principles the processes of gall-making may be given brief class descriptions.

The gall-wasps go through what has been generally termed a life cycle to round out their complete history. This consists of several generations from egg to adult, each passing through the universal insect stages. In most cases there is but one insect to each gall; in some a dozen or more. The legless, feeding and growing larva and the inactive, remarkably transforming pupa are held within a tiny cell in the center of the rounded gall and thus doubly protected.

But only one of these generations of gall-wasps is

WORTHY OF LONG DAYS OF STUDY

The oak-nut galls, with one cut open, to show the central larval cell; below, the oak-knot galls; and at the bottom, the gall on blackberry cane and the gall wasp, much enlarged, that produces it and that possesses no end of interesting traits



AN INTERESTING GROWTH THE NATURALIST WILL ENJOY

The cockscomb galls on the elm are seen above, and in the centre the aphid inhabitants, mother and young. At the lower right is the winged migratory form and at the left, the asexual, gall-making female, both greatly enlarged

composed of both sexes; otherwise they are known to be parthenogenetic, the lone females laying self-fertilized eggs in the spring that hatch both males and females. These latter, emerging, produce eggs in the summer that result in females only in the fall and from their eggs what may be termed the first generation of lone females bore their way out of the winter galls in the spring. In the case of some species having this life cycle each of the spring, summer and fall generations are the authors of different shapes of galls.

The tiny, two-winged flies known as gall-gnats go through only one generation in temperate latitudes. The eggs are laid commonly on leaves or succulent stems, or more rarely on flower buds and on the fruit. Goldenrod, wild sunflower and tickweed are commonly infested; also such trees as hickory, dogwood, sour gum, hornbeam and cherry. Many of the larval maggots feed within the galls, each in its cell; the inactive pupa may so remain, or the gall may burst open, permitting the pupa to fall to the ground and there transform to the adult fly. Too little is known regarding the peculiarities of the different species.

A number of the gall-making aphids have been studied in detail. Of these also there are many generations to round out the life cycle and some of these, too, are females only. Many of the species make galls on both the leaves and the roots; between these generations is one containing both sexes, only the males of which are winged. Another generation has winged females that have been called the migrating brood. There are a great many peculiar forms. The galls are invariably thin-walled and entirely hollow and numerous larvae are disclosed within, often grouped around the wingless mother. The noted grape Phylloxera that has caused so much injury to vineyards in Europe and California is a well-known form, making galls on both leaves and roots. It is negligibly harmful in its native eastern United States.

Most wonderful, as already hinted, are the peculiar influences that cause these growths. In all cases each species induces a distinct form, constant in character and quite different from all others. The precise nature of the galls is governed by the position on different parts of the plant and the character thereof; thus galls on the leaves are soft, light in color and thin-walled, showing certain leaf characteristics throughout. Those on green twigs of new growth are filled with spongy, somewhat fibrous matter, with exteriors light in color; and those on the harder, woody young branches are compact and firm, often growing quite hard with the aging of the wood, and are dark brown or the color of the natural bark.

How are the plant cells affected to form such a variety of shapes, each peculiar to its race or species? A gall-wasp punctures the immature leaf or stem with her keen ovipositor and deposits an egg. Instead of the growth continuing in the normal habit a distortion takes place as the larva grows and evidently from the manner in which it feeds. Each species, as has been said, influences the growth differently from all others, though with wonderful similarity between the individuals of a species.

The result is a swelling commonly of a spherical shape or elongated and unevenly cylindrical; within

it are cells, some species having one of each and others having many. They are generally held in place by the inner growth, but in a few of the smaller leaf galls on oak these cells are loose, one occurring in each gall, though double and triple galls may be found with no walls between them and in which the two or three cells fall into the lower swelling. Within each of these small inner cells the very inactive larva of the wasp dwells and goes through its transformations to pupa and imago, emerging in time as a tiny, perfect four-winged creature. Most gall wasps have shining black bodies; the larger abdomen of the females may be rich reddish-brown in color.

Galls were known long before the insects that were responsible for them had been discovered. Names were given these galls first, to be specifically applied to the insects later when the relationship was established. When nearly all of the species were included in the genus Cynips (meaning, very inadequately, a stinging insect), there was a tentative agreement among the discoverers of species to give within the name a reference to the genus of the tree upon which the galls were found. Thus the large, semi-hollow, thin-walled apple gall on white oak with internal radiating, threadlike filaments from the inner larval cell to the outer shell, was called *Cynips quercus inanis* (meaning, rather ludicrously, a stinging insect of the oak and of an inane or uncertain character, referring, no doubt, to the filaments stretching in all directions without a definite purpose). This method has its failings.

THE SPINEY GALL ON WILD ROSE BUSHES

The adult midge that causes the gall is at the top, greatly enlarged, while the victim plant, with the bayonets, is shown in its natural size below. At the right, enlarged about ten diameters, is the larva of the fly

A later and supposedly necessary nomenclature apparently does away with this trinomial method and almost every species has been placed in other and varied genera, often, I must say, without adequate study and reference. But let anyone even with half an eye upon Nature's problems observe with some care the intricate habits of the gall-making insects and he will be richly repaid, even without knowing the confusing names.

One little wasp filled with the motherly instinct lays an egg near the midrib of a forming leaf; at this spot the orderly process of growth is subverted and there is formed a cell within a larger, hollow enclosure one-half inch in diameter. Another wasp, so alike that the two can be told apart only by examination under a magnifying-glass, punctures a neighboring leaf on the same tree and the result is a tiny cell supported by a hundred threads within an enclosure an inch and a half in diameter. Why the differences? Why must the leaf thus infested grow into one shape for a certain kind of wasp and into something quite different for another? Why are not these shapes less constant from the punctures of individuals of the same kind?

One of the commonest woodland forms is the oak-nut gall, shining brown in color, about the size of a small marble, firm in texture, growing on the twigs of white oak. Another closely allied form shows an elongation on the side of the sphere that appears as though the normal stem desired to continue reaching out. Each of these galls is filled with a firm, semi-fibrous material about as hard as cork, but without its tenacity; the single cell is held firmly in the center and is no larger than a grain of rice.

In the early spring a form is often observed on the young leaves of scarlet and pin oak that takes the color

of the leaf and is soft and succulent. The leaf is restricted in its growth by having its energy turned into the formation of the gall. This may be called the green berry gall; the inner cell is loose. A later generation makes another kind of gall.

We find on the stems of pin oak and sometimes on scarlet oak hard black, woody knot galls of rough exterior, often an inch and a half in diameter, more often nearly round than elongated. Within these woody masses there are sometimes as many as thirty cells, but generally there are not more than twenty. Each has its larva or pupa or the emerging tiny wasp according to season. Similar galls, more elongated and not so hard, are found commonly on blackberry canes; they may measure up to four inches in length and over an inch in diameter, and sometimes contain as many as fifty cells.

An oft observed product of the gall midges is the roseleaf gall, bright red and green with numerous long outer spines; also the great apple gall occurring on shoots. These are red and green with the interior composed of a soft material that later becomes harder and that surrounds several cells each containing a fat, well-protected larva. Thus these tiny creatures have developed complex and very efficient methods to defy their enemies, entailing a chemical process quite beyond our ken.

Probably the most thickly grouped galls, perhaps the most plentiful generally, are those of a Phylloxera on hickory leaves; they often dot the surface so thickly as to give a pebbled appearance. Round, of varied sizes, green but of different depths of color, they are not unpleasing. On the under side of the leaf each gall has a slit which permits the egress of the louse when migration is necessary. Within the galls the mother aphid and her numerous young feed composedly, though some of these broods may not be entirely free from parasitic enemies both hymenopterous and dipterous.

The larger oak apple galls are sometimes regarded by children in the country as a kind of fruit of the tree and are now and then eaten, the little insect inmate included. The flavor is rather pleasantly tart, of decided tannic character, but there are never enough of the galls found at one time to become injurious.

A curious-minded citizen once informed the writer that oak trees have two kinds of seeds: one the acorn, the other small and white within a sort of berry growing on the leaves. Even after each supposed seed was cut open to disclose the tiny grub inside there was a reluctant admission of the true nature of the growth.

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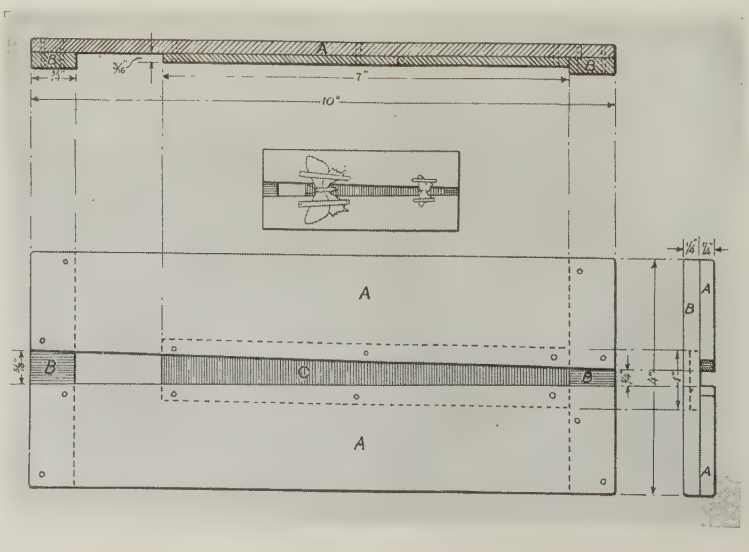
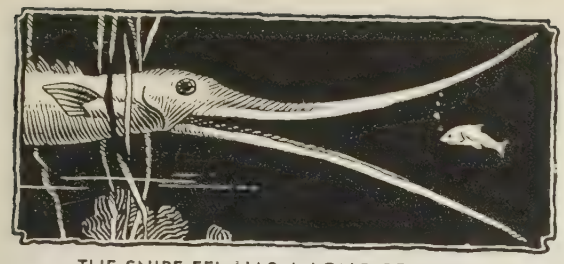
A BUTTERFLY MOUNTING BOARD

EVERY COLLECTOR WILL FIND IT VALUABLE

BY WILSON C. WHITE

THOUGH many mounting boards are on the market, a useful one may be fashioned at home, as shown in the diagram. The mounting surface (A) is four inches by ten inches, with a gap running the length of the board one-fourth inches wide at one end, and five-eighth inches at the other. The board used for the surface should be about one-fourth inch deep. Under the gap a one-inch strip, seven inches long (C), is fastened. Resting posts (B) one-fourth inch deep are placed at each end. The specimens are placed with the thorax fitting in the gap, and pinned through the thorax to C. The wings are spread out on A, and held in place by narrow strips of transparent paper, such as wax or glassine paper, pinned on the board. After several days, when the wings have hardened, the butterfly may be transfered to a case. The variation in the width of the gap allows for butterflies of different size. The board has proved of utmost value to me in making my collection. It is so easy to make and practical in handling that even the novice collector will have no difficulty with it.





THE SNIPE EEL HAS A LONG REACH . . .

BUT NO LONGER THAN THE HALF-BEAK

FUNNY FACES OF THE DEEP

BY PAUL KANE

ILLUSTRATIONS BY JEX

FACES that only a mother could love. Flat faces, inverted faces, underslung and overripe faces, saw-toothed and cock-eyed faces. Faces with tapersnouts, with simpering, silly mouths like those of lovesick grammar school girls, faces with eyes on top of the head, two on the side, at the end of the nose. Faces that grin, that frown, that look scared; faces that resemble politicians in debate, or traders striking hard bargains, or women in traffic jams. Funny faces—faces of the seven seas.

THE PORCUPINE FISH WEARS HEAVY ARMOR

NO BEAUTY CONTESTANT IS THE ELEPHANT FISH

No man, 'tis said, can help his face. But fishes grew theirs with malice aforethought. They spent the last million years in getting just the right touch—in fact, it has been one of their important occupations ever since the Devonian Age, when they left the murky darkness of the unknown and speculative to grow a backbone and thus establish something new in evolutionary fashions. They have been very practical about it all during this time—looks were no object. They wanted faces to fit their bodies, appetites, and environments. The beauty of utility was the only beauty they sought.

THE FOUR-EYED FISH SEES ALL

ARGYROPELECUS —AS HOMELY AS HIS LONG NAME

Since there were a variety of needs in different parts of the world, fish developed particular types of faces having little in common with one another. They all started out as Ganoids, which order includes garfish, sturgeons and mudfishes, and as Placoids, among which are the sharks and skates and rays; and "each in his separate star, worked his face as he wished it, to fit the things as they are." Sharks grew great gaping jaws, "the better to eat you with," and narrow heads, pointed for speed in the water. Star gazers, who sought a life 'mid flowery beds of ease, just sat on the bottom and stretched and stretched, eugenically speaking, until they developed a Mammoth Cave into which currents waft food without effort. A few of the clever ones that, if in human form, would have been wildcat oil-company promoters, rigged up a bit of bait in front of themselves, and let the fish fish for it, miss, and slip into their jaws.

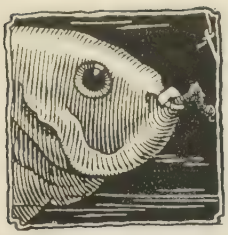
Consider the flounder. Solomon in all his glory was not arrayed like one of these. The young start out with conservative ideas; they have an eye on each side of the head like well behaved creatures. Then they get radical with age, shift both eyes to one side, and flatten out the light-colored side to fit the bottom of the ocean. Fine for getting food, but who would want to look like that? Perhaps only a flounder.

A few fish have made weapons out of their faces. The sawfish ground, sharpened and filed during the ages, and finally a novel, useful and convenient combination harpoon, meat cutter and rapier was evolved. The snipe eel elongated both his jaws, and created to his satisfaction a beautiful pair of Chinese chopsticks which precede his length by half. He looks like the head of a crane, to whom a good joke has just been told. The half-beak charges his prey with a fixed bayonet, while the trumpet fish has rigged his mouth out on the end of his weapon, with an eye to economy, so that no time or food will be wasted after his kill.

BUILT FOR SPEED AND SAVAGERY IS THE SHARK

THE RAVEN'S NOT PREPOSSESSING

A few fish are carefully outfitted for detective work, and



THE PARROT FISH HAS A QUEER BEAK

one of the cleverest is the four-eyed fish that carries a periscope. He has his eyes raised above the top of his head, and constructed so that they see all there is to be seen with every look. Not as much gets by him as does by a small-town gossip.

There are many fish that are the proud possessors of the homeliest faces in the world. Thus do they frighten their enemies. They work on the theory that while beauty is only skin deep, ugliness goes right to the bone. The raven, one of these, is a masterpiece, but the porcupine fish, outfitted with coats of mail, doublets, greaves and lances to protect him, must cause him a twinge of jealousy occasionally. This fish, which conceitedly assumes that anyone would eat him even if he didn't wear all his armour, is so well strapped in that he can only move his eyes, mouth and fins, and looks like the customary cartoon of Big Business.

Fish specialize in varieties of eyes. Some, as the fish of Mammoth Cave, Kentucky and the volcano fish, dispense with them entirely, but others have great goggly ones that nearly cover their skulls, and some are bent around and twisted. Beauties all!

THE FLOUNDER GROWS RADICAL

The great swallowers suggested to man the idea of steam shovels, for their flattened skulls support hardly anything but mouth. On the other hand, there are other fish with dainty little openings hardly big enough for a respectable yawn, which pout like the mouths of jilted school boys.

Whether the faces of the males possess any special attraction for members of the opposite sex is a matter of importance and conjecture. If they do, then fish love is considerably more blind than in human circles.

For ages the fish have worked on their faces. For ages more they will go on. Perhaps they will improve with time. Perhaps someone will warn them of their error before it is too late. But at the present—only queer, distorted faces, inverted, slant-eyed and top-heavy faces—the funny, funny faces of the seven seas.

INDIAN BREAD ROOT

A FAMOUS FOOD

BY FANNIE HEATH

PHOTOGRAPH BY AUTHOR

THE PLANT INDIANS AND RANCHERS USE

A palatable vegetable that has an interesting history

WHILE not as pretty as some, the Indian bread root, *Psoralea esculenta,* never fails to hold interest when its life story is told. It was one of the most highly prized vegetables of a number of the Great Plains nations of Indians. The tuberous thickened roots were the part used and were rarely ever more than three inches in thickness and four or five in length. They were covered with a thick woody covering that when slit down the side peeled off like a banana peeling. These portions were peeled and dried and stored for winter use. With but crude implements the harvesting of these roots must have required much patient toil as they are not easy to dig from a depth of several inches even with the best of implements now in use.

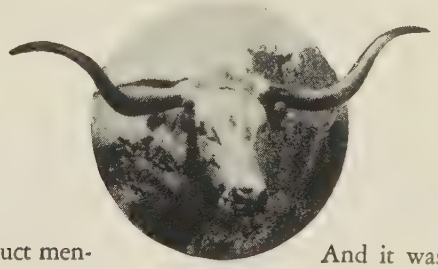
They were eaten both cooked and raw and are not unpalatable either way. The children of the prairie ranchers dig and eat them at the present time.

The plants grow from ten to eighteen inches high and the whole plant is covered with silvery, silky hairs. The pale blue and white blossoms are in dense furry clusters. As soon as the seeds are ripe the stems break away just below the surface, leaving no trace of their location, so they had to be harvested before this happened.

They are not difficult to grow in the home garden and make a desirable addition to the wild or ethnographic section. They ask only that they be given a well drained sunny location and a soil not too heavy and made porous by the addition of a small amount of very fine sand. Care should also be taken to mark the spot so that the roots will not be disturbed and may be easily found after the tops blow away.

ROMANCE OF THE GRASSLANDS

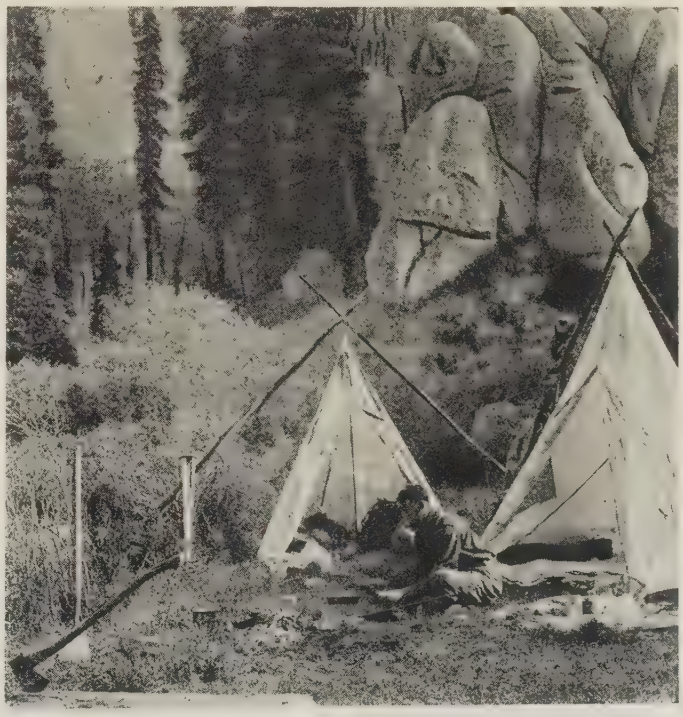
BY WILL C. BARNES



GRASS is the first agricultural product mentioned in the Bible. The Lord, says Genesis, busied himself for two whole days in creating the waters, the firmament, night and day and finally the dry land. Then, on the morning of the third day—"And God said, 'let the earth bring forth Grass'." From that day grass has been one of the great benefactions of the human race.

From the beginning of this country's settlement the grazing of livestock, specially cattle, has been surrounded by a glamor and romance that still clings to it. Next to the Indian, the cowboy of the western grasslands has always been and probably always will be one of the most romantic figures of our times. Bold, reckless, chivalrous, happy-go-lucky Centaur that he was, his like has never been known in any other civilization. Without him, one of our greatest industries would lack its most potent attraction. We had no wandering troubadours, no knights errant about whom to weave romance and poetry, but their places have been well taken by those Knights of the Lariat of whom a cowboy poet once wrote:

"Oh a man there lives
On the western plains
With a ton of fight
And an ounce of brains
Who herds the cattle
And robs the trains
And goes by the name
of Cowboy!"



A LONE HERDER'S CAMP IN GRASSY WILDS
Here one can find in its fullest the romance that is the grassland's

Up to the present time he and his long horn cattle have been the *pièce de résistance* of the moving picture industry. Without his picturesque figure, his six-quart hat, spurs, high-heeled boots, leather chaps and his sure-footed ponies, the movies would never have made the rapid progress into the affections of the public they have. "Westerns" still capture many hearts.

And it was those wonderful grasslands of the far West upon which the cattle business and the cowboy flourished. They have been the backbone of our agricultural progress.

Nor has the romance of the grasslands been without its humorous periods. Millions of cattle and sheep, the property of local settlers, are today grazing on the Government's grasslands in our great national forests. The settlers pay a fair price for the grass and the forest rangers see that no more are grazed than each man's permit calls for. Occasionally some hard-up owner fails to pay these charges in advance, as Uncle Sam always insists. It then becomes the Forest Ranger's duty to keep after the delinquent one until he "comes through."

Often it has been necessary to write rather sharp letters. One Oregon permittee sent the following rather direct reply to an urgent request for prompt settlement of his fees, long overdue:

"Deer Mister Ranger:

I got your letter about my grazin fees not bein paid. Dont you worry none. I aint forgot you. Please wait a while. When some dam fellers what owes me munny pays me I pays you. If this was judgment day and you was no more prepaired to meet your maker as I am to pay these dam grazin fees you would sure have to go to hell and thats a fackt. Hopin you are the same."

Few people realize the extent to which our civilization has been built up through the grazing of livestock. Specially is this true of this country with its vast areas of open prairie lands which, in the early days of our national growth, furnished the pioneer settler with an assured

means of supporting life. Someone has well said that the cow has ever been the advance agent of civilization, the foster mother of the human race. She supported herself and offspring on the grass about the settler's primitive cabin. Alive she furnished young and old one of the most stable and best foods known to mankind. Beef supplied the food of the Anglo-Saxon race, which has never yet been conquered by other races. "Her sons," says an unknown author, "drew the plows which first cultivated the lands of the New World, hauled to market the products of the field, and with slow but steady gait moved the chattels and household goods beyond the mountains to new homes in the farther West."

The pioneer explorers who set forth to penetrate the vast interior regions of this continent used oxen almost exclusively as their motive power. Along the route these animals lived on the grass furnished by prairie and meadow. The Santa Fé Trail, over which hundreds of thousands of teams, horses, oxen, and mules traveled year after year, could not have existed but for the grasses that covered the vast prairies it traversed.

In the early days everything waited upon the grass. The pioneer emigrants delayed their start westward until the grass was reported green on the prairies. The restless plains Indians withheld their raids upon both their red brothers and their white neighbors until there was grass upon which their ponies could live. The migrations of the game animals waited likewise for this green covering of the plains. Today the whole world awakens from its winter sleep and comes to life with the first sign of the greening of the parks in cities and the meadows and pastures in the rural regions and the out-door trek begins.

Of all the countries of the world none is so blessed as ours in its vast and varied supply of grasses and grass-like plants, native and introduced. Nowhere in the whole world have been found grasses comparable in value to our native grama, buffalo, curly mesquite, and bunch grasses, so admirably adapted to our western semi-arid areas. There the native grasses grow in regions of limited rainfall and cure on the ground as hay, furnishing fine feed for livestock during the winter months. Nor are there any countries of which we know that can claim such fine areas of purely summer range as are found in the western part of the United States in the high mountain regions, where the lush grass furnishes feed for millions of domestic livestock; feed which must be removed from these ranges with each season or be lost forever.

Many of the grasses which we Americans fondly imagine are native to this country turn out, on investigation, to be immigrants from foreign shores. Our favorite brome grasses all came to us from Central Europe, as did Kentucky bluegrass, orchard grass and timothy. From the Mediterranean we have the well-known redtop. Kentucky bluegrass came to us as *Poa pratensis* but as it found its best environment on the blue limestone areas in Kentucky it was re-christened with a good American name and acquired its citizenship papers under the name Kentucky Blue.

In 1850 sheep were shipped to San Francisco partly to stock the California ranges and partly to feed the hungry miners. They came by sailing vessels from Chile and carried entangled in their wool the seeds of Alfileria, one of the most wonderful forage

GRASS

BY JOHN J. INGALLS

NEXT in importance to the divine profusion of water, light, and air, those three physical facts which render existence possible, may be reckoned the universal beneficence of grass.

Lying in the sunshine among the buttercups and dandelions of May, scarcely higher in intelligence than those minute tenants of that mimic wilderness, our earliest recollections are of grass, and when the fitful fever is ended, and the foolish wrangle of the market and the forum is closed, grass heals over the scar which our descent into the bosom of the earth has made, and the carpet of the infant becomes the blanket of the dead.

Grass is the forgiveness of nature—her constant benediction. Fields trampled with battle, saturated with blood, torn with the ruts of cannon, grow green again with grass, and carnage is forgotten.

Streets abandoned by traffic become grass-grown like rural lanes, and are obliterated.

Forests decay, harvests perish, flowers vanish, but grass is immortal. Beleaguered by the sullen hosts of winter it withdraws into the impregnable fortress of its subterranean vitality and emerges upon the solicitation of spring.

Sown by winds, by wandering birds, propagated by the subtle horticulture of the elements which are its ministers and servants, it softens the rude outlines of the world.

It invades the solitude of deserts, climbs the inaccessible slopes and pinnacles of mountains and modifies the history, character, and destiny of nations.

Unobtrusive and patient, it has immortal vigor and aggression. Banished from the thoroughfares and fields it bides its time to return, and when the vigilance is relaxed or the dynasty has perished it silently resumes the throne from which it has been expelled but which it never abdicates.

It bears no blazonry of bloom to charm the senses with fragrance or splendor, but its homely hue is more enchanting than the lily or the rose. It yields no fruit in earth or air, yet should its harvest fail for a single year famine would depopulate the world.

plants for early spring growth and feeding on desert ranges our stockmen have ever known. Sown broadcast by the grazing sheep it has spread all over the Southwest and is today so thoroughly Americanized that few suspect it is not a native to the land in which it flourished.

Many years ago the State of Kansas sent to the United States Senate one of its most distinguished and gifted citizens, the late John J. Ingalls. Born and raised in the midst of the vast grassy prairies of that state, he was most eloquent in his description of its beauties. Among his many writings was that charming bit of word painting, now a classic, entitled "Grass," which appears herewith.

But now comes the natural question. Is there any romance in the grass lands? Is there no romance in the alchemy of old mother Nature that changes the grasses and forage plants of the plains into fat beef and mutton; that turns green grass eaten by a red cow into the whitest of milk which when churned to butter is of a glorious golden hue?

Some months ago Dr. Walter Damrosch, internationally famous director of symphony orchestras, spoke of the letters he had received from persons at distant points who heard his orchestra by radio. One letter came from a lone sheep-herder in far-off Saskatchewan. He wrote that one evening in December after he had bedded down his sheep near his camp on the northern plains, cooked his supper and bathed the dishes, he then, with pipe alight, tuned in on the ether and picked up Dr. Damrosch's orchestra. For an hour the sheep-herder sat there in his lonely camp miles from other human habitation and listened enraptured to the music that came to him through the air across more than two thousand miles of forested mountains and grassy plains.—Romance of the grass lands.

AN EARLY DAY COWBOY
One of the most romantic figures of our times

Nor was this the first incident of its kind, when music came to a sheep camp from the air. Almost two thousand years ago in far away Palestine one starlight night in December "there were shepherds abiding in the field keeping watch over their flocks by night." They had no radio but suddenly in the heavens above them shone a Star, and from the skies came music, a song of the angels: "Glory to God in the Highest, on earth peace, good will toward men."—An early romance of the grass lands.

And again, one dark night many years ago, we were holding a herd of long-horned steers on the grassy plains of northern Arizona, en route to the railroad for shipment. It was a wild night. Overhead the stars shone as brightly as they do in that high rarified western desert air. Dark angry clouds lit up by flashes of lightning were billowing up from the west. The wagon boss expected a stampede at the first clap of thunder and warned every man to be ready to ride when it came. As we lay on the ground near the chuck wagon trying to

THE CHUCK WAGON, HAVEN OF THE HUNGRY
Symbol of the round-up and the grazing lands, it is still a popular and useful institution

SHEEP GRAZING ON NATIONAL FOREST LAND

Millions feed upon the mountain grasses that otherwise would die wasted

roar and rattle of a stampede.

Then the heavens opened and the rain came down in torrents. Out into the storm, half dressed, many of them bare-headed, the riders drove their ponies. Five miles from the camp they "milled" the herd to a standstill on an open flat. The storm was over, the stars came out overhead; the steers, forgetting their fright, dropped down to rest and sleep. Leaving three men to hold them, the rest of us rode sleepily back to camp, guided by the light of the cook's camp fire which he had started up preparatory for a four o'clock breakfast that should start the day.

sleep I could hear one of the men on guard, singing as he rode around the bedded-down cattle. The tune he used was the old time love song "My Bonnie Lies over the Ocean" which fitted the words admirably. In voice he was neither a Caruso nor a Gigli, but what he lacked there he made up in volume, enunciation and strict attention to business. His job was to "hold them oxen" and if his musical efforts were contributing to their peace of mind he was content.

He sang lustily the herder's song, and as he finished the last words the silence of the night was broken by a sharp flash and a peal of thunder that seemed to split the skies wide open. It brought every man in camp to his feet for high above the thunder was the

WHERE BUSH FEED GROWS ALL SUMMER LONG

The cow is the advance agent of civilization; foster mother of the race

The romance of the grasslands! 'Tis a thing as old as the world itself, as enduring as the stars in the sky.

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HOW ABOUT A WINTER CRUISE?

So much interest was shown last year in the West Indies cruise conducted by our Field Trip Department, and so successful was the party that a repetition of that activity appears advisable during the coming winter. It is, to be sure, a bit early to be thinking about cruises to warm climes but it will be mighty nice next winter. We would appreciate hearing, however warm it may be at the moment, from any who may be interested in this cruise, and we would specially like to have suggestions as to ports of call of outstanding interest as well as indications on the length of time available for making such a trip. Special shore excursions are arranged for members of the American Nature Association parties and some may have ideas on this point. These trips are conducted purely as a matter of service to our readers and the Field Trip Department wishes to make them thoroughly valuable and interesting. May we have your advice?

WITH ROD AND REEL ON DESERT SANDS

THE STRANGE DOINGS OF WILLIS ALLAN ROWE, SNAKE-FISHERMAN

BY JOHN EDWIN HOGG

ILLUSTRATIONS BY THE AUTHOR

IF you should ever chance to meet, on one of those streamless sandy deserts of California, a heavy-set individual togged for the trout stream, with high-boots, fly-rod, creel and all, and should see him casting to and fro amid the cactuses and mesquite, don't rush to the nearest 'phone to call the authorities. Instead, approach him and say, "Mr. Rowe, I believe? Have you captured any new reptile specimens this morning?" For the chances are excellent that you will be having the good fortune to meet at his work Willis Allan Rowe, president of the Herpetological Society of California, and perhaps the foremost authority on the reptiles of the West.

NO WONDER THE SHERIFFS WENT TO GET HIM

Mr. Rowe presents the appearance of an unbalanced angler as he fishes for his reptiles

• • •

WHAT THE RATTLER THINKS OF CACTUS

When he will crawl over such spines, horsehair ropes certainly will mean little to him

A GOPHER SNAKE KILLS A GOPHER

With a savage, methodical speed the reptile crushes the life out of the defenceless rodent while the photographer looks on. This picture indicates the economic value of this variety of reptile

For the past twenty-seven years Mr. Rowe has been "fishing the desert" at the risk frequently of his own life and continually of a deluge of ridicule and derision to clear up some of the mysteries of reptile behavior and to shed more illumination on the least known and least studied chapter of biological science. He is not a college man. He has no titles or degrees either before or after his name. Yet scientists and professors come to him for information, and a mass of knowledge hitherto undiscovered has reached the world by way of his rod, line and creel.

It was fifteen years ago, in San Fernando, that I first met Mr. Rowe. I had been attracted to a

THE LARGEST IN MR. ROWE'S ZOO

This indigo snake, held by the author, who, incidentally, doesn't seem too fond of it, is the biggest California specimen taken by Mr. Rowe

display window in which was arranged a most realistic desert scene. Among the cactuses and other desert plants numerous reptiles crawled. I asked a bystander what it all meant. He was an old-timer in San Fernando and the gesture he used in telling me that Mr. Rowe had built the display—a motion commonly connoting "wheels in the head"—indicated clearly popular attitudes.

I sought out Mr. Rowe, and found that he was neither a crank nor a circus snake charmer, but a scientist who had spent years making a logical, unprejudiced study of a long-neglected biological subject—a subject that today is largely shrouded with congenital prejudice, superstition, unreasoning fear and appalling ignorance. And as my early acquaintance with him ripened into a priceless friendship, I came to realize that he was one of those adventurers that have brought the race up from the cave—a seeker after knowledge for whom no risk is too great if it but casts a beam into a dark corner of life yet unexplored.

But let Mr. Rowe tell of his avocation in his own words:

"It was about 1905 that I became interested in reptiles for the sole reason that they seemed to be the only form of animal life that could not be studied from books. Such volumes on the subject as were then available were inadequate, inaccurate, and displayed a woeful want of unbiased, scientific observation. So I set about the task of gaining first-hand information and established nearly twenty-five years ago the nucleus to my present reptile collection.

"The bulk of human knowledge concerning the reptiles, I early learned, was largely inaccurate. The majority of people even today cannot understand anyone making a scientific study of these creatures. If you mention them, your friends say:

THE DESERT FISHERMAN

Sane, scientific, unafraid, Mr. Rowe is pioneering in a little-known field

SNAKE MEET LEATHER

A live rattler poses beside Mr. Rowe's left boot, through which the fangs will not penetrate

'Oh, the horrid, slimy things! I hate them!' As a matter of fact, snakes are no more slimy than canary birds. They are usually so clean that their scales glisten, and this gleam has evidently been mistaken for slime.

"My very interest in snakes and other reptiles has long subjected me to much unreasoning, human aversion. Many people still feel that no man in his right mind would have anything to do with a snake, and any one who

would handle them is morbid, queer, perverted, or even worse. For such reasons much of my early herpetological study was carried on as privately as possible. But long ago I put such ideas aside. I have since gone ahead with my work, ceasing to care what unreasoning individuals may think of me.

"Perhaps the thing that has branded me as a lunatic more frequently than anything else is my method of catching reptiles for study. I use a trout rod and line, and a trout fisherman's creel for carrying live specimens. Almost any reptile to be found in this country can be safely approached to within the length of my fishing rod. It is then quite easy to drop a slip noose over its head. A pull on the line draws the noose tight. The reptile is then easily lifted off the ground, and when suspended by the head, he is removed from the line with little opportunity to make use of teeth or fangs.

NOT RECOMMENDED FOR NERVOUS SOULS

"Hand-feeding a gila monster with its favorite delicacy is safer than feeding bears in the national parks," says Mr. Rowe

A COLLARED LIZARD IN THE NOOSE

The reason for the rod, line and creel at once becomes apparent—they are most efficient in reptile collecting

• • •

OBSERVING A RATTLER'S WEAPONS

The snake-man does much of his research work in the field, with microscope and live specimens

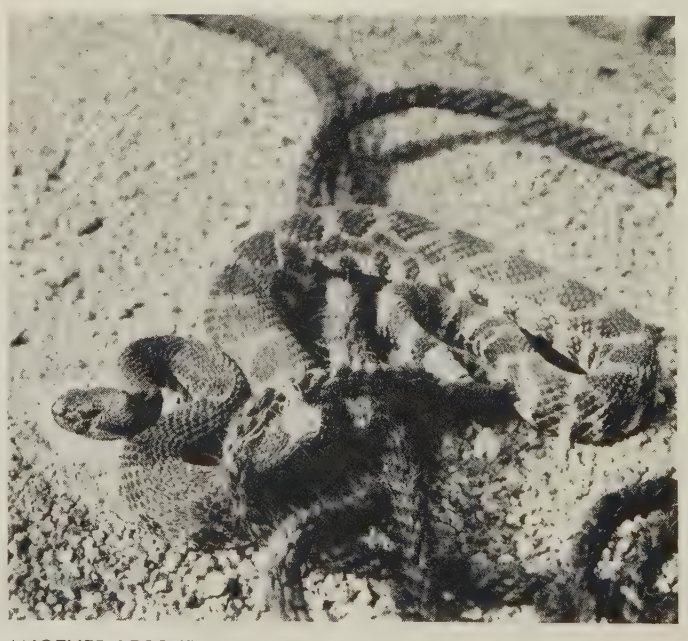
"Now fancy what people think when they see me with this sort of an outfit, working somewhere in the desert, perhaps miles from the nearest water. They take one look and are convinced I'm an enthusiastic trout fisherman gone mad! I even had a couple of deputy sheriffs come out after me once. I'd gone on a collecting trip up in the Mojave Desert, and was working just a few yards off a highway leading into Bakersfield. I had been there for two hours and during that time a number of passing motorists stopped to have a look at me. They usually took just one look, and then drove on at a faster rate.

"I'd been 'fishing' through the sagebrush for possibly three hours when a big car rolled up from the direction of Bakersfield. Two big, husky chaps stepped out and came toward me. They approached to within twenty feet, planted their hands in their pockets, and stood there

watching me. Presently one of the men spoke.—'Well, Mr. Walton, you come with us, and we'll show you a stream where you can get bigger and better fish than you're getting here.' I replied to inform them I wasn't interested in fish. For a moment they stood there contemplating me. Then, the first speaker asked, 'If you're not interested in fish, what in the name of blazes are you up to—dressed as you are, carrying a creel, and fly-casting around out here in this desert? If you're not the crazy man we came out here to get, you'd better name yourself before we throw the nippers on you and take you in. We're deputy sheriffs.'

"It took me some twenty minutes to convince those deputies I was not a madman. Eventually they realized from my conversation and my papers that I was sane and drove away after apologies and admissions that the joke was on them.

"From more than two decades of reptile study I am convinced that the average person's inordinate fear of snakes plays an important part in many fatalities from bites of venomous species. The bite of a rattlesnake, for instance, is unquestionably less dangerous to a person who is capable of controlling fear. In this belief, I speak from experience, for I have been bitten three times by rattlesnakes, and I am convinced that my cultivated ability to remain unafraid has had much to do with the fact that I'm alive today. From the first two bites I responded to emergency treatment and recovered without serious consequences. The third episode was far more serious, however, for a large specimen of the Pacific rattlesnake, *Crotalus oreganus,* had dug his fangs directly into a vein of my left hand. Abnormal stimulation of my heart action from fear and excitement at that time would undoubtedly have sealed my doom, but my knowledge of the danger from this source helped steady my nerves, and I managed to pull through. My experiences have also convinced me that the serum treatment as an antidote for reptile venom is the only one that can be relied upon. The use of potassium permanganate hypodermically injected is undoubtedly worse than worthless, while whisky as an antidote has nothing whatever to support it other than popular tradition.



ANOTHER LEGEND EXPLODED
A rattler makes his way out of a coil of horsehair rope, paying as much attention to it as a bird to a state line

"Now, contrast my experience with rattlers with that of a man who had better remain nameless. I was returning home from a collecting trip when I came upon a man and woman who were obviously in dire distress. The man was lying beside the motor car, apparently dying, and his wife, completely hysterical, was tearing her hair and screaming.

"Finally I got out of her that her husband had been bit by a rattler. I left her with Mrs. Rowe, and went to work on the man. Carefully I hunted him over for marks of the fangs, but search as I could, I did not find them. I did find, however, a dozen terrible cholla thorns firmly embedded in the flesh of the thigh just above the knee.

"Without saying anything to the others, I left the man and followed his footprints back to where he had tried to bring his wife and their car into the view-finder of his camera. The last heel-marks ended directly against a wicked clump of cholla, and under the cholla was a luxurious growth of desert peas capable of rattling like a dozen snakes when touched. Ten feet in front of the cholla lay the camera where it had been flung by the terrified man as he felt the pain of the cholla and heard the rattle of the peas on which he had stepped. The psychological effect had been complete! He then rushed to his wife, threw her into hysterics and lay down to die from a rattlesnake bite. Of course he did not die, but he was bedridden for two weeks from a bad case of nerves and a heart attack induced by fear and shock."

"Certainly not!" declared Mr. Rowe emphatically, when asked whether his recent almost fatal rattlesnake encounter would cause him to give up this work.

He then turned to a filing cabinet in his study, and pulling open a drawer, withdrew several bulky bundles of correspondence.

"These," he said, pointing to a bundle that must have contained fifty letters, "are from persons who have *actually seen* hoop snakes! I have all the other letters filed according to the various kinds of reptile myths. One pile is letters—'eye-witness stories,' mind you—about glass snakes that have been seen to break up and go together again. Another is letters about snakes that swallow their young as a means of protecting them in time of danger until they can be safely disgorged. Here is a pile of letters about milk snakes that have sucked cows dry. The other letters touch upon innumerable snake myths—all sorts of tales of unnatural herpetological history. Yet, they are things that are popularly believed even today; great-grandmother tales that have (Continued on page 194)

EASY TO RECOGNIZE

By the white markings on the spread tail, which are characteristic of the species. This parent bird is anxious about the youngsters

THE LARK SPARROW

One of the most handsome of the many sparrows

SURVEYING THE WORLD

From a favorite perch on a mullen stalk. Life holds little time for leisure, however, when one has a hungry family of birdlings in the nest

OFF FOR A LARK

BY FREDERICK R. FLICKINGER AND LAWRENCE D. HIETT

PHOTOGRAPHS BY THE AUTHORS

It was Decoration Day. On every side of the pasture in which we hunted, the air was melodious with the songs of vesper and field sparrow that mingled sweetly with the more distant notes of meadowlark and song sparrow drifting in from neighboring fields. From the woods came the enthusiastic voicings of the indigo bunting, the soft warble of the rose-breasted grosbeak and the intermittent calls of thrashers and catbirds. But for all these we had no ears. We were looking for the nest of a famous pair of lark sparrows which we knew must be close by.

These two lark sparrows were the only ones that had been reported in the vicinity of Toledo, Ohio, since 1925. They had first been discovered by Mrs. M. R. Littlefield and Mrs. H. C. Mitchell, and seemed to be eastward pioneers from the Mississippi valley, where their kind are fairly abundant. For the past five years they had nested in a sandy pasture bordered on all sides by woods, and here it was we ambled to and fro, our eyes glued to the ground, on this delightful morning.

Only one brief encouraging glimpse of our birds had rewarded us in our long search; but it sufficed to spur us on. We explored the field thoroughly and made side trips into the woods to see what they held in the way of bird life. But no lark sparrows could we find.

Then suddenly, in one corner of the field, a bird flew up into a small maple sapling. We approached to make an identification. No bird in sight. We walked to the tree; still no bird. We hadn't seen it fly. We shook the tree, and as it waved back and forth we spotted our bird clinging tightly to an upper branch. It was a lark sparrow—with food in its bill! We retreated to watch and wait, anticipating a long vigil since our experience with ground-nesting birds had shown us that watching an adult carrying food took time and gave at best but a general idea of the location of the nest. No sooner had we withdrawn than the bird flew to the ground some thirty feet from the tree. We strained our eyes to follow the course it took through the grass. Then a second lark sparrow flew down to the same

A LITTLE TOUCH OF HOME LIFE

Rather forcing the feeding. "Come now, eat up all this grasshopper, or you get no dessert"

AN EXAMPLE OF CONDITIONED REFLEXES—FEEDING TIME AND YAWNS

The arrival of a parent at the nest served of itself to open four mouths as wide as they would stretch

spot, and shortly departed carrying a bit of excreta.

This was surely clue enough, so we approached the spot. *Whrrrr!* And the first bird flushed directly from the nest, set so deep in a tangle of wild raspberry vines that it would have been possible for one to step flat footed on it without harm to the young. And there were four tiny babies cuddled down in its soft centre.

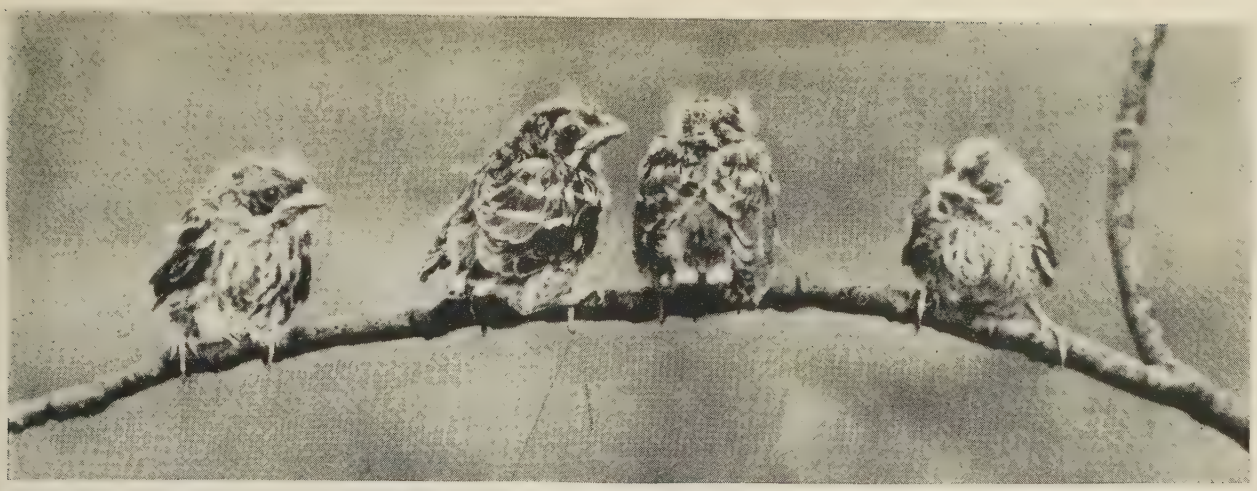
Our search thus so happily ended, we wasted no time in unlimbering our cameras and setting them up on tripods near the nest. We carried the release threads to a spot some forty feet distant, and prepared to wait. In a very few minutes the birds were back, intent on the family cares and minding not a whit the clicking of cameras and the faint buzz of the motor-driven movie outfit.

That such a rare bird would give us so glorious an opportunity for photographs seemed almost too good to be true. We advanced to change plates. The parent which had been brooding slipped from the nest as we came within six feet of her and scuttled off through the grass, dragging a wing and crying piteously. We took a few more pictures and, as the sun was getting low, decided to return at another time for additional shots.

Again and again we came back and on every occasion we found the birds amiable in the extreme. Dissatisfied with observing from a distance, we drove the car to within fifteen feet of the nest and from there were able to watch every move of the birds and to photograph them in just the positions we wanted. They ignored us completely. One time when we wanted to be sure of our focus, we sat quietly behind our cameras not four feet from the home while an adult approached and let us focus directly on her as she fed her young. We secured shots at a distance of two feet by lying prone and holding the movie camera in our hands. It was a rare opportunity and we made the most of it, with four dozen splendid photographs and one hundred feet of movie film as trophies of our lark.

The lark sparrows were an ideal couple. "Share and share alike" was their watchword. They relieved each other regularly while brooding and took their turn at scouring the field for food. Grasshoppers were the staple of diet. Sometimes the prey was too large for the babies to manage, in which case the adult would masticate it a bit and deliver it back to the young in more easily swallowed morsels.

When we returned a week later, the young had grown apace and showed every symptom of not being long for the nest. We knew then that the time was ripe to wind up our series with a few photographs of the parents feeding the young out of the home. A forked branch thrust into the ground near the nest served as a perch for one of the young, who sat docilely enough and chirped enthusiastically when the parents approached.



OUT ON A LIMB—AND SULKY ABOUT IT, TOO

Four little lark sparrows wonder if their parents will ever be able to find them so far from home. They soon learned to come out and meet them, however, thus insuring prompt service

But this enthusiasm soon got the better of him, for time and again when they were on the verge of coming to him with food he would flutter from the branch and scuttle off to the approaching parents. This was exasperating, as we had then to replace him and begin once more at the beginning. In the meantime the other three young had discovered that by venturing out to meet the arriving meal they were assured of prompt service, and before long three small lark sparrows were trailing about the field in the wake of the foraging adults. This was not what we wanted at all, so we captured them all and placed them in a camera case, open at the top, which was stationed nearby. After a few excursions to the empty nest the parents located their offspring and promptly mounted the rim of the box to feed them as if nothing had happened. But we had our hands full for a few minutes when we returned the four young to the nest, for they were lively and restless, and it was necessary to hold our hands over them for some little time before they finally settled down. We returned a few hours later to make sure that all was well and found to our joy that the four young were still snugly in place while the parents were coming and going with food for a late supper.

A month later, a second pair of lark sparrows was found to be mating in this region, but in all the field trips taken during the past few years, these two pairs represent the only nesting record of this bird for our section of the United States. And how we looked for them!

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THE WHISTLER RETURNS

TEN YEARS ago, the sight of a "whistler", one of the two native swans, was cause for wonderment, so rare had the bird become. This spring, however, it is estimated that as many as 7,000 birds passed over Michigan, and the photograph below, taken from a blind at the Monroe Marshes adjacent to the mouth of the Detroit River, indicates the recovery the bird has made. A long closed season on hunting the bird is mainly responsible for its recovery.

The other American species, the trumpeter, is almost extinct, and but little hopes are held for a return of the old days when the great flocks covered the sky.

COURTESY OF THE DETROIT NEWS

ANEMONES—PICTURESQUE WINDFLOWERS

THE STORY OF FLOWERS WHOSE HISTORY GOES BACK MORE THAN TWO THOUSAND YEARS

BY DOROTHY E. PLETCHER

ILLUSTRATIONS BY J. HORACE MC FARLAND

BACK in the days when the Greek city-states ruled the world, their hillsides were continually arrayed with alert, diminutive flowers whose loveliness no doubt retarded the steps of more than one beauty-worshipping Greek. Mayhap the learned men philosophized over them much in the manner of the poet with the "flower in the crannied wall." Indeed, these flowers derived their present name from that early home, because those imaginative Greeks called them "windflowers"—you see, the Greek word for wind was "anemos." And that is how our anemone got its name.

It is fatuously claimed that Pliny thought the anemone bloomed only when the wind blew upon it; however, isn't it entirely probable that the wise old man might have been amusing himself with fanciful imaginings of this airy-like bloom? For it is precisely this light, butterfly quality—this daintiness and freshness—that has appealed alike to all ages and all classes of society from the time of Pliny right down to the Hoover administration. Furthermore, it gives ripe promise of rushing far into the future on its cometlike course of popularity.

THREE WINDFLOWERS FOR YOUR GARDEN

Here St. Brigids, a gay cut-flower, the gladsome fulgens and the poppy-flowered anemone beam at one happily

From China comes the widely admired Japanese anemone, *A. Japonica,* erroneously named, for it is really Chinese in origin, being Japanese only by cultivation. Robert Fortune, a Scotch plant hunter, first introduced it into England in 1844. From the Levant in 1596 issued *A. coronaria* and *A. hortensis.* The Swiss Alps have contributed many varieties, and our own Rocky Mountains have likewise proved themselves a delightful source of Alpine-like varieties.

The Buttercup family is proud to claim the anemone for a member, and what a valuable one it is! By far-sighted scheming its company may be enjoyed from early spring until late in the fall. And as if that were not enough, it boasts of so many different varieties from which to choose that one is dazzled by merely anticipating the variegated display ahead.

Through the years of raising anemones, the flower has been gradually improved until it now presents an extraordinary array of brilliant colors. Assuredly it puts many of its rivals out of countenance. But that is not all. It has developed to a large size;

there are both single and double kinds, the doubles having the lead on the affection of the public. And so, today, when one is selecting a bloom for early flowering qualities, freedom of blossom, and adaptability as a cut flower, the anemone will be chosen. A garden without anemones? What a poor thing it is!

To achieve a season of continuous bloom, take into consideration the fact that there are two distinct classes of anemones: the early sorts, predominantly dwarf, which are pleasant little occupants for the rock garden, and the Japanese type, which blossom in late summer and fall. The latter are much taller than the early kinds, making nice big clumps; incidentally, the nurserymen warn that these should be transplanted only in the spring.

Because anemones are so very lovely we want to keep them in the garden scene as long as we can. And in so planning we obtain rather the effect of completing a cycle, for we plant tubers in protected places in the fall for resultant bloom in March, followed by those in more exposed locations for an appearance in April and May. June bloom is anticipated by planting tubers in January; July blossoming, by February planting. And so the march goes through the year.

ONE OF THE BEAUTIES FROM JAPAN

Queen Charlotte has semi-double, deep pink flowers that are adaptable for cutting, and make the bloom a favorite

As for the spring-bloomers, *A. coronaria*, better known as the poppy anemone, ranging in color from reds through blues, is one of the earliest; it makes the garden gay with its flowers during March, April and May, and one may have it in the summer, too, if he has been thoughtful and planted a second lot during the spring months. April and May take on a singularly festive air with the violet flowers of *A. pulsatilla*, the pasque flower, which grows about a foot high, the soft white flowers of the wood anemone, the rue anemone's demure blooms, and the red-tinged buds of *A. narcissiflora*, from the Swiss Alps. The month of June calls forth such charmers as *A. canadensis* or meadow anemone, an outstanding native sort, and *A. sylvestris*, the snowdrop anemone, the season for whose creamy white bell-like flowers extends from April to May and into the month of brides.

In the rôle of gay defenders against a dull moment in the garden during the summer months, one encounters that unique *A. cylindrica*, otherwise known as Lamb's Wool, the white flowers of which are replaced by interesting seed tufts of white wool which remain on the plant for some time. Then there is the lovely snowdrop anemone which blooms from April to early summer. Far-sighted spring planting of the variety provides it during the summer as well. The Swiss Alps have given us one of the very foremost of all summer bloomers—the gorgeous Alpine, which delights with its sprightly blossoms from June to August. Curiously enough, this plant of the snow-clad peaks varies in size according to the elevation at which it grows, diminishing in stature the higher its home. In an average garden its white

Dorothy Pletcher has been Mrs. Dwight G. Howerth for a number of years, and divides her time most expertly between free-lance writing on a wide variety of subjects and the maintenance of a most delightful home, as all Wellesley graduates should do. She lives in Washington, D. C. and, incidentally, has windflowers in her fine garden

ATTRACTIVE AS CUT FLOWERS

Whether in the garden or the vase, anemone justifies by its beauty the care taken with it

flowers are borne aloft on stems fifteen inches high. *A. Drummondi* is the Rocky Mountain variety of this anemone.

The fall styles of our windflowers are controlled largely by that valuable hardy herbaceous perennial, *Anemone japonica.* September, October and November gave up the idea of being dreary when this species contributed *A. japonica elegantissima* with its satiny pink flowers gracefully poised on four-foot stems, and monotony simply dares not show its face at this time of year when *A. japonica,* Mt. Rose, airily disports its large, double rose-pink flowers. For those who are partial to brilliant darker shades, there is *A. japonica,* Prince Heinrich, with double flowers almost red, and *A. japonica,* Queen Charlotte, bidding for our favor with its semi-double, deep pink flowers which are most adaptable for cutting. Then there is *A. hupehensis,* so closely allied to the Japanese variety that one might call it a cousin. It gives us mauve-rose flowers on stems about two feet high and is really invaluable because of its willingness to bloom faithfully from early August until after heavy frost.

Being the fibrous-rooted species that it is, the Japanese anemone frowns on having its roots disturbed. Although propagation is usually by division in March or by root cuttings in August, new varieties are raised from seed. When using root

DOUBLE BLOOMS HAVE BEEN CREATED BY HYBRIDIZERS

One of the more recent developments of Anemone pennsylvanica which has added so much to the popularity of the group

cuttings, have them approximately two inches long, plant them at a depth of about one-half inch, water them freely, and have them in partial shade until they send out rootlets, which will be after about two weeks. During the cold weather, cover the plantings generously with leaves.

Sharing honors with the Japanese anemones for popularity are the poppy anemones, but that is easy to understand when one sees the lovely French strains, the chrysanthemum-flowered and the beautiful St. Brigids—all of which are varieties of this species. They average a foot in height and are famous for their large, bright blooms.

At present the St. Brigids are enjoying quite a vogue, because of tremendous improvements of late. Obligingly prolific in multiplying, brilliantly colored and large as to form—the blooms averaging four inches in width—they are almost ideal. The new Bird strain in particular has interesting possibilities.

Plant your tubers about two inches deep, in a generous bed of rich loam with a portion of potash, giving each tuber about a foot of leeway in each direction. These are set out approximately three months ahead of the anticipated blooming time; in warm weather, only two months in advance is necessary. One may plant his tubers either in early spring or early in the autumn. If seeds are planted, do the sowing in June in a fairly sheltered bed out-

CORONARIA IS AN EARLY BLOOMER

It is one of the first anemones to make its appearance, and is likewise one of the gayest

THE BRILLIANCE OF ANEMONE ADDS TO THE ROCK GARDEN

Here coronaria, the poppy anemone, shows what its reds and blues will do during March, April and May in the way of festive show

doors, and place the seeds four or five inches apart. It is a good idea to pat over them a rich cover of compost. And it is an equally excellent idea to remember that the seed should be planted so that it will not be disturbed for at least a year and a half—this is to allow ample time for new offsets to become established. Be kind enough to keep them shaded from the sun's havoc-working rays during the summer months. They will also appreciate having some bone meal on their bill-of-fare once in a while.

The St. Brigids' wealth of color and keeping qualities make them peculiarly valuable as a cut flower. After they are picked, if the little leaves which form near the top of the flower are held under water, the stems will be prevented from drooping and spoiling the sprightly appearance of the bouquet when in the house. Never a dull corner for the home with St. Brigids in the vases! There are fragile orchid colorings, scarlets, flames, watermelon tones, ruby reds, and so on endlessly.

Consider the varieties for the rockery. Now there is tiny *blanda,* about four inches tall, valuable for its tendency to bloom early. There are whites, pinks and blues from which to choose. Especially beautiful is *sythinica,* a blue and white type, and *atrocaerulea,* a dark blue. Many gardeners are eager for the first glimpse of the Italian windflower, *apennina,* so dainty with its six-inch stems bearing blue flowers. Slightly taller, *Anemone hepatica*—usually called just plain *hepatica*—blooms from very early spring until May, and also likes a shady corner of the rock garden among cool ferns.

We can never overlook the refreshing wood anemone —who does not love it? In Switzerland one finds its white flowers growing gaily in great abundance. In this group there are some really worthwhile types. Try, for instance, that pale lavender, *robinsoniana,* or *alleni,* a delightful blue, or that majestic single white, *grandiflora.* A typically American bloom is *Pulsatilla occidentalis,* a form of the lovely pasque flower, which is native to the Rocky Mountains, and even though it attains a height of two feet, it is appropriate for the wild garden because its bluish flowers are so very lovely. Perhaps those who like the warmish hues of yellow think we are forgetting them, but no—we hasten to suggest that glorious yellow wood anemone, *A. ranunculoides.* It grows half a foot high and blooms from March to May.

Even though the tiny windflowers are capable of making an uncommonly brave display all by themselves, their beauty is even enhanced when they appear among snapdragons. In rock gardens, of course, they bloom side by side with the many contemporaries of their seasons —Iceland poppies, violets and others. Once outside of the rock garden, our anemones with their characteristic grace so proudly adjust themselves in front of a background of evergreens and there make such a splendid picture that they are in a fair position to capture our hearts forever. It is not difficult to understand their success in window boxes, either.

Although they are extensively used in borders, it is when we come suddenly upon anemones naturalized under trees that their beauty is truly breathtaking. So it is that we feel secure in predicting that even though one may travel far, and search and search and search, he will never find, in any clime, blooms more lovely than those of our saucy, inimitable windflowers.

THE AUSTRALIAN FANTAIL

A BIRD OF THE BUSH

BY KILROY HARRIS

ONE of the most engaging birds in the "bush" around Melbourne, Victoria, Australia, is the white-shafted fantail, a gray, diminutive songster with a long fan-shaped tail. It is so friendly that an angler may find one perching on his rod while fishing in a stream. The nest is a very dainty structure of grass, covered in cobwebs, and saddled on a horizontal stem—a masterpiece of bird architecture.

IN THE ROSE GARDEN AT CHILD'S PARK

One of the delightful vistas that has made this miller's creation a show place for Northampton

CHILD'S PARK

BY MARGARET WHITTEMORE

Being another article in the series on interesting Nature hobbies

WHERE THE PUBLIC IS WELCOME TO REST

Stone benches permit contemplation at leisure of the fine effects Mr. Child has achieved with tree and shrub

IN Northampton, Massachusetts, lives a man who for many years has been a prominent miller. He started as a bookkeeper in one of the Northampton mills as a young man, and has now become wealthy enough to retire and devote his entire time to the enjoyment of a Nature hobby.

Just fifteen years ago Mr. Charles E. Child bought forty acres of undeveloped land on the outskirts of the town and decided that nothing could make him happier than to convert it into a park for the enjoyment of the public. He built, through years of labor, one of the finest parks in the land and one of the few that are maintained at the personal expense of the owner, though open to the public. Mrs. Coolidge is often seen walking through it with her dogs.

The forty acres of Child's Park, as it is called, include twenty-five acres of smooth green lawn, several acres of forested land, and five gardens. There are seventy-three varieties of deciduous trees, forty-nine evergreens, and fifty-six kinds of shrubs. Many of the trees and shrubs are very rare. Practically all the trees that are hardy in that latitude are growing on the spacious, well-kept grounds.

In the gardens are three thousand irises, among which are one hundred and sixty-five varieties, including specimens from Germany, Japan, Siberia, Spain and other distant lands. There are two hundred and seventy varieties of gladioluses — five thousand plants in all. The peony beds, too, are brilliant, and contain three hundred and ninety-four plants of fifty-five varieties. There are fifteen thousand spring-flowering bulbs. It is in the springtime that Mr. Child himself most enjoys the gardens, and may be found in them every morning by nine or ten o'clock. His wife is as much interested in the work as he, and helps in the selection and care of the various plants.

There are altogether about three hundred varieties of perennials. The exquisite rose garden, just below the beautiful stone house with its arched porticoes, is a delightful retreat. There are four hundred and eighteen hardy roses in it, with flagstone walks between the beds.

The part of the park in which Mr. Child takes perhaps the most pleasure is the wild flower garden with the lily pool in the heart of it. Turning off from one of the main drives, one follows (Continued on page 195)

HOW THE ENTRANCE TO WASHINGTON'S HOME WILL LOOK

Tree-lined and flower-bordered will be the terminus of the Mt. Vernon Memorial Highway, now under construction. Parked automobiles will be screened by trees

TREES TO LINE MT. VERNON HIGHWAY

APPROACH TO NATIONAL SHRINE INSPIRES TREE-PLANTING

BY JOYCE SATER

THE ROAD of Remembrance to Mt. Vernon, the home of George Washington, is rapidly being completed. It is to be tree-lined and flower-bordered and the landscaping plans will make this Mt. Vernon Memorial Highway a fine tribute to the Father of His Country. The motorist, upon seeing this magnificent drive along the Potomac, will at once be reminded of the slow method of travel in Washington's time. At Mt. Vernon the visitor will see the coach in which Washington traveled when mud was a major menace and when the trip to Philadelphia or New York took days.

But this memorial highway is to be more than a road over which wheels may turn. The highway is to be beautified as are other Roads of Remembrance in many parts of the United States. Two fine elms, descendants of the Washington Elm at Cambridge where Washington took command of the army July 3, 1775, will have a place on the highway. They are the gift of Mrs. James H. Dorsey of the Daughters of the American Revolution of Maryland.

These trees have been registered on the national honor roll of the American Tree Association, in Washington along with the thousands of others planted to mark the bicentennial of the birth of Washington in 1932.

The last of twenty-four American elm trees has just been transplanted in the circle before the entrance gates to Mt. Vernon. The elm was chosen by the landscape architect because of its beauty, longevity and hardiness. The trees were brought from Maryland, about thirty or forty miles from Mt. Vernon, and were moved at night. They are from twenty-five to fifty feet high, and have a spread of twenty-four to forty feet. It is planned to dedicate the trees as Memorial Elms at a commemoratory observance before the Mt. Vernon gates in February, 1932, in connection with the bicentennial celebration.

The circle, which has a diameter of about 347 feet, is the terminus of the Mt. Vernon Memorial Highway, which is being constructed under the supervision of Thomas H. McDonald, chief of the U. S. Bureau of Public Roads. The highway extends from Arlington Memorial Bridge to Mt. Vernon along the Virginia shore of the Potomac River, and passes through the historic town of Alexandria, famous for its old churches and houses.

BEAUTIFYING THE TERMINAL CIRCLE

The Bureau of Public Roads is doing a tremendous amount of work to the entrance to Mt. Vernon

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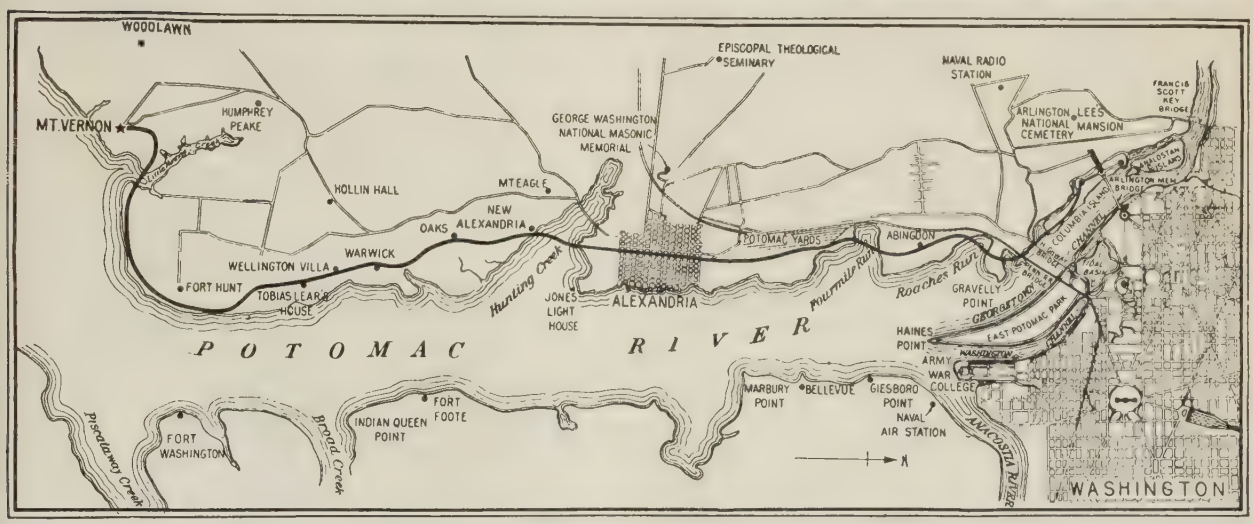
WHERE THOUSANDS WILL SOON TRAVEL

The route of the Mt. Vernon Memorial Highway which will be ready by 1932



General Washington recognized the great beauty and dignity of the elm as an ornamental tree. According to his diary, he rode on Thursday, January 27, 1785, along the side of Dogue Creek and the Potomac River "in search of Elm and other Trees for my Shrubberies. Found no Elm." But he must have found elms on some other day, because on March 4, of the same year, he writes: "Compleated my Serpentine walks with Elm trees." And again on March 29, he transplanted in the groves at the end of the house two elms along with other species.

The elm has figured in several historical events of the country. The famous treaty of William Penn with the Indians was made beneath the branches of an enormous elm, which remained standing in the suburbs of Philadelphia until 1810, when it was blown down. Its site is marked by a marble column and its age was estimated to be 233 years.

It was under an elm in Boonesboro, Ky., the site of the fort built by Daniel Boone along the Kentucky River, that the first legislative session beyond the Alleghenies met in 1775, and established the capital of the Transylvania Company. President Hoover planted an elm on the grounds of the White House for the American Tree Association as his part in the tree planting phase of the bicentennial celebration. A famous elm on Boston Common, supposed to be existing before the settlement of Massachusetts, measured twenty-two feet in circumference at the time of its destruction in a storm in 1876. Liberty elms were planted in Providence, Newport and New York at an early date. The Providence elm was dedicated to the "Sons of Liberty" on July 26, 1768. The first log cabin of what was to be Oberlin College was erected beneath an elm which still stands at a corner of the campus. This college celebrates a centennial in 1933. New Haven, Connecticut, is known as the "City of Elms," because of the many stately trees of this species which line the streets of the university town.

The tree grows naturally and rapidly in every state east of the Rocky Mountains. It frequently attains a height of ninety to one hundred and twenty-five feet, and has a trunk diameter of from six to ten feet. There are few species of deciduous trees that live longer than the elm. Under favorable conditions, it will reach the ripe old ages of one hundred (Continued on page 194)

FIRST LINE ATTACK

A honey bee on a red clover bloom, mining the nectar for your table. Clover honey is the most popular of all varieties although alsike and white clovers are the main sources

• • •

HOMEWARD BOUND

With saddle bags laden with pollen from sunflowers, to be made into bread for the young larvae in the home hive. No loafer is this bee!

HONEY PLANTS

WHERE THE BEE SUCKS

BY FRANK C. PELLETT

WHEN you dip down into your honey jar to scoop up the golden sweet, did it ever occur to you to visualize the distant beginnings of this delicacy? Perhaps it has come from far-off Arizona, where under a cloudless sky hundreds of bees dipped into the blossoms of alfalfa to load their tiny sacs with nectar. Perhaps it started on its way from the black lands of Texas or the heavy soils of Georgia, mined from cotton blooms by the persevering insects. It might claim as its native heath the waving fields of buckwheat in the Middle West, or the mesquite-dotted desert to the South or the deep, fragrant clover meadows of the Northeast. In fact, any one, or any few, of at least 2000 plants may be the ultimate benefactor you should thank for the clear fluid that so pleases your palate.

Many years ago a professor in the Michigan College of Agriculture estimated that there were 1800 plants in this country that yield honey. Since his estimate, many more honey-bearers, particularly in the far West, have been discovered. Yet most of the sweet that goes to market is gathered from a very few, and not more than a dozen sources are widely known. White Dutch and alsike clover, melilotus or sweet clover, alfalfa and buckwheat furnish most of the product sold in the northern states, Basswood, the orange tree, cotton and a few other plants supply a small amount and most of the rest is produced from so many different flowers that the principal ingredient could be only the subject of a guess.

A beekeeper may find his own bees gathering nectar to fill their supers from some plant which is not sufficiently common and widespread to bring it to public attention. For example, black locust, a tree common over a wide area, yields honey freely for a few days in the spring, yet it is doubtful whether one could buy a case of locust honey in the Chicago market at any time.

Catnip is famous for its attraction to the bees, although in all my thousands of miles of travel among American beekeepers, I have never seen a single pound of sweet which I felt sure all came from this plant. I have seen carloads from alfalfa, clover and buckwheat.

Persons who are not well informed as to the variation in honey from different sources or under different conditions of climate and soil often fear impurities. For-

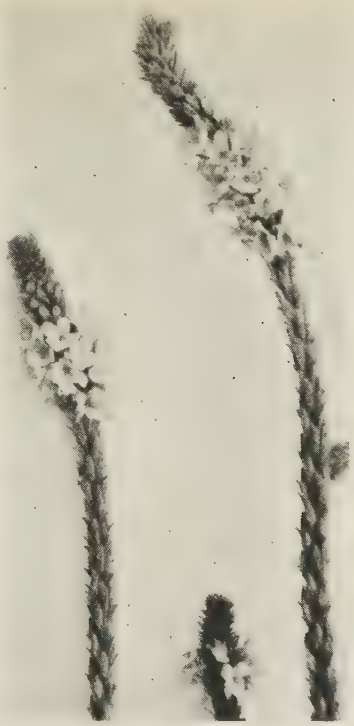
A GOOD WEED

The blue vervain is common in the pastures of the Mississippi Valley, and supplies some of the delicacy

• • •

WILD SUNFLOWER

It is a good honey plant only when very abundant, for the bees need many flowers for their sweet-making work



THE PALO VERDE—A DESERT PRODUCER

This tree, whose green bark and branches give the impression of rich verdure, even when it is leafless, yields a rich crop of honey

tunately the pure food laws now protect the consumer from such fraud. Formerly the product was often adulterated, but such cases are now very rare.

Man, so successful with artificial butter, evaporated milk and synthetic fats, has never learned to imitate the bee's special manufacture. It contains an aroma peculiar to the flowers from which it is gathered and a color distinctively marking its source. Honey from buckwheat is very dark and of a pronounced flavor. The product from sweet clover is just the opposite,—it is very light, almost water-white in color and of a mild spicy taste. One who knows soon comes to recognize the different varieties just as he learns the quality of the different apples on the market.

A peculiarity of honey which varies with the plants is the tendency to crystallize or granulate when subjected to changes of temperature. One may buy a jar of clear liquid honey, only to find it apparently turning to candy within a few days. Alfalfa honey from the Rocky Mountains, for example, often granulates very quickly, so that a jar changes from a clear liquid state to a white and hard candy within a few weeks. Honey from the sage in southern California or from the tupelo in Florida shows very little tendency toward crystallization, and accordingly bottlers often mix these varieties with other kinds to retard the candying process. Just why one kind should solidify while another does not is one of the puzzling questions the beekeeper is still trying to answer.

It is surprising to discover that there are even variations in the honey from the same plant when it grows under different conditions. Alfalfa honey from the Rocky Mountains is light-colored and mild, but the product of the same plant grown in the valley of the Colorado River in southern California or Arizona is much darker and stronger. It is known that the soil, climate and altitude all have some effect, although just what weight each of the factors has is not altogether understood. There is still much room for observation and research on this problem.

Honey from white Dutch clover in the pastures of the Middle West is lighter in dry summers than in summers of normal rainfall. Temperature, however, does not explain the difference in color between different plants. In the hot desert region of the Southwest we find some plants, such as the mesquite, yielding light honey, while others produce very dark honey.

The conditions that favor a maximum secretion of nectar in one plant are unsuited to the needs of another. Sweet clover yields best in the hot dry summers of the northern plains region. A rich limestone soil, coupled with a moderate amount of moisture, warm days and cool nights seem to meet its requirements fully, and

in the Dakotas and surrounding territory it seems to thrive wonderfully. Yet buckwheat in the same region is of little importance as a honey plant; it does best on the light sandy soils in the humid region surrounding the Great Lakes, and in Ontario, New York, Pennsylvania and Ohio. And in this region sweet clover yields but a small crop compared to the amount produced in the plains area.

Cotton yields nectar freely on the black lands of Texas and on the heavy soils of Georgia, while it adds but little to the beekeepers' store on the sandy soils of either state.

Such factors must be kept in mind by the beekeeper in selecting a location for his apiary. He must not only be within reach of enough plants that yield nectar to supply his needs, but soils and other conditions must be suited to these particular plants. Many a beekeeper in the Mississippi Valley has been disappointed because his bees failed to gather a good crop of honey from the buckwheat fields in his neighborhood. The same fields in New York would have given him a surplus worth while. Big crops of honey from the orange groves in the interior valleys of California are often secured when the groves near the coast yield but little. The influence of the fogs from the ocean are given as the probable explanation of the difference in the two localities.

In the Ozark regions of Missouri and Arkansas, parts of Tennessee, Kentucky and Alabama, the bitterweed, *Helenium tenuifolium*, grows along the roadsides, barn yards and other waste places. It yields in abundance a beautiful golden honey, but the quality is most surprising. It is as bitter as quinine. It has a relative in the North, commonly called sneezeweed, which furnishes honey of a similar quality, although perhaps not quite so offensive to the taste. Neither plant is a desirable addition to the honey-producing flora of any neighborhood because a little of this honey will spoil anything with which it is mixed. The chinquapin of the southeastern states is likewise unpopular for this same reason.

On the prairies of Nebraska and Kansas and southward to Texas, snow-on-the-mountain, *Euphorbia marginata,* is a common midsummer plant. Because of the fact that it is seldom sufficiently abundant, it is not often heard of as a honey producer, yet in some localities it yields a surplus quantity of a dark amber color and of a peculiar, though not unpleasant, taste. The new honey in the combs has a reddish color.

The wild sunflowers are well known features of the late summer landscape over a wide scope of country, yet reports of honey from them come from only a few places. The bees must have immense numbers of flowers within reach in order to store honey in a large quantity. The *Helianthus* yields freely enough, and where it is plentiful the beekeeper gets a crop from it. One producer at Ventura, California, secured a carload of honey from wild sunflowers one season following a wet winter when the plants were unusually abundant.

Coneflowers, *Rudbeckia,* are good examples of many wild flowers that yield nectar freely but are not of much importance to the beekeeper because they are scantily distributed. There are hundreds of plants of this kind which would be valuable if they grew as

BEEHIVES IN NORTH DAKOTA

In the midst of a sweet clover field. The location of the hives must be chosen with care

• • •

THE SOUTHWESTERN PRODUCER

Mesquite is the most widely distributed source of honey in the Southwest, yielding an excellent product

densely as the clovers, alfalfa and buckwheat.

Even some of the weeds will add much to the crop of sweetness. The blue vervain is common over a wide area in the eastern part of the United States. It is found along roadsides and in pastures generally and blooms in midsummer. The bees visit it eagerly and in some neighborhoods gather enough honey to provide some surplus for market. Some related species occur westward to California and are likewise of importance in limited areas over the Southwest.

The milkweeds yield honey of a light color and peculiar thick waxy texture with a pleasing flavor. Remarkable crops are sometimes reaped from them, especially in northern Michigan, where

SNOW-IN-THE-MOUNTAINS
Which yields an amber honey of peculiar but not unpleasant taste. It is not a common producer

• • •

ATTACKING THE PEONY
Three honey bees rival each other in sucking nectar from this garden plant

they occur in such abundance as to occupy the land completely. The pollen masses often become attached to the legs of the bees and the insects are unable to return to the hive because of the impediment.

In Florida the bees get most of the honey from trees. The tupelo grows in extensive forests in the northern part of the state. Carloads are gathered from this source along the streams. Black mangrove is another tree common to the Florida seacoast. It is found only in the vicinity of salt water. The blooming period is in June and July and when conditions are favorable the returns are immense. For several years following the freeze in 1895, however, this tree failed to yield nectar in important quantity, probably due to the injury received at that time.

The palmettoes, the most conspicuous feature of the flora of southern Florida, yield nectar in quantity sufficient to attract the attention of the commercial producer. The bloom comes in midsummer but the flowers are delicate and sensitive to weather conditions. Too much moisture blights the blossoms while extreme dry weather is also unfavorable. The honey flow is not abundant more often than about one year in three because of the fact that ideal weather conditions at time of bloom occur only in about this ratio.

In the desert regions of the Southwest the honey flows seem very largely to depend upon the rainfall. Many plants common to the region bloom at uncertain periods depending upon chance showers. Some bloom several times during the year, following every heavy downpour.

In southern Arizona is found the palo verde or green bark acacia, a tree of striking and unusual appearance which is common to a limited area. The bright green bark of trunk and branches gives the appearance of luxuriant vegetation when the tree is entirely leafless. Some beekeepers with extensive apiaries in this region get a surprising amount of honey from it, and the product is entirely marketable.

The mesquite is the most important and most widely distributed tree in the dry areas of the Southwest. It is common from Texas to California and occurs as far north as southern Nevada and Utah. Many beekeepers depend to a large extent upon it for their honey crop. The giant cactus also supplies much honey, as does the guatemote or *Baccharis,* common along the streams.

There are hundreds of plants which yield no nectar but which are valuable to the beekeeper as a source of pollen. Pollen is the one food needed by the bees in addition to honey and must be had for feeding the growing larvae. Ragweed, corn, grasses, hickory, oak, walnut and many other trees and plants thus provide something for the bees in the way of necessary food.

Almost any locality will support a hive or two of bees but it is only in favored situations that large apiaries sufficient to support a family in comfort can be successfully maintained. Bees fly from two to five miles around the apiary in search of forage and the successful beekeeper must be familiar with the flora within this area. Often by moving the bees but a very few miles the crop can be greatly increased because of better pasture.

The old belief of the sages, that fine things never happen by accident, but are produced only through labor and skill, is borne out by the gathering of honey. The climate, the soil, the sun, the plants,—all play a part in the intricate processes through which it comes to table. Golden with the glint of sunshine, sweet with the fragrance of flowers, clear as a May day, it is laid at man's door by the insects as their unique manufacture and as one of the sweetest contributions to civilization. And after all, where the bee sucks is a matter man would not wish to disregard, specially if he considers his palate.

• • •

A TRIPLE ROBIN'S NEST

BY EDWARD A. PREBLE

OF ALL our birds none is more generally loved than the robin, and at least one of our states, Virginia, has designated him as the State bird. Thus it is fitting that a pair of robins should have built this remarkable nest in a Virginia garden.

Early in May, 1928, this pair of birds decided to raise a family on a branch of a grape vine which was trained on the side of a small garden house. The withered stalks of last year's weeds, the stems and roots of grasses and other plants, strips of rags that had held the garden vines to their supports—these formed the base, and on it was reared the usual cup of mud, lined with fine grasses. In this typical home the eggs were laid and all seemed well.

But as the lengthening branch put out its leaves, adding their weight to the support, the nest proved too heavy for the frail vine. Each day it tilted more and more and finally the precious eggs rolled out and fell to the ground. But robins are persistent birds and this pair still had faith in their selection and would not abandon a site that seemed to be on such friendly ground. So a second nest was reared on the uptilted side of the first one. Now the birds seemed to sense that time pressed, and this nest was less elaborately built than the first, though formed of much the same materials. Soon another set of eggs occupied the new home. But still the weight bore down the slender vine, now with a burden of green grapes added to its load, and the second lot of eggs was dashed to the ground and broken.

Then on the ruins of the double nest the faithful birds reared a third structure. This is the least bulky of the three though the cup that was to hold the baby birds was not slighted. This time the faith of the parent birds was rewarded. The vine seemed to have bent as far as it could and the eggs were brooded in safety. Before the grapes had ripened, the young that hatched from the third laying were able to fly and to make their own way in the world.

What a lesson in industry, and love of offspring, and persistence in carrying out the original plan in the face of difficulties! How many human beings might well take heart from the final success of these brave birds. Evidently the word "fail" was not in their vocabulary.

The nest pictured was built in the garden of J. M. Offley, of Hamilton, Virginia, and we are indebted to him for the facts attending the building of this remarkable structure. The nest was generously presented by him to the U. S. National Museum, where it will form a fitting monument to the brave pair who reared it.

Helps and Hints FOR HOME AND GARDEN

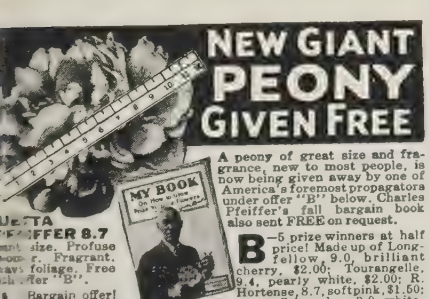
PLANTING THE GARDEN, MONTH BY MONTH

By Romaine B. Ware

September in most of our gardens seems to offer a new lease of life, as it were. In many sections fall produces excellent color masses in the borders. Fall asters, chrysanthemums and anemones are among the highlights of this display. *Aconitum fischeri* and *wilsoni* prove excellent blue flowers at this season and if you have properly cared for your annuals, they will be a mass of color. Seed heads should be promptly removed, cultivation and watering must not be neglected and many varieties need to be sheared back so they may make new growth and another burst of bloom.

This is also an important planting month. Peonies are probably at the head of the list as fall is the only safe time to move them. It is best to leave them alone, but if they must be moved be sure to divide. No peony plant which has been growing in one spot more than two years should be moved without dividing. Never try to take up an old clump and put it in a new location without breaking or cutting it into several parts. The best way to go at this is carefully to dig up the entire plant and shake or wash off the soil to expose the roots. Don't try to divide at once, as the roots are very brittle, but let it stand a few hours, exposed to the air, till the roots wilt somewhat and you can then cut them up without breaking where you do not wish to. A good peony division is a root not more than six or seven inches long with three to five eyes or buds at the top. Larger roots are no better; in fact, except in the South, large roots are not as good as standard three-to-five eye divisions.

From early in September until the ground freezes is the only season of the year to plant peonies and this work must be done right. Select a location with good drainage, sun at least half the day, far enough away (Continued on page 191)



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36 named Hyacinths, mammoth bulbs, light blue, dark blue, rose pink, scarlet, white, yellow, 6 of each 4.00
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ORDER NOW FOR FALL PLANTING. We recommend these trees for fall planting. The best time is from August 25th to November 15th. This will allow them to establish root systems in fall and winter months, so as to gain a big growth next spring. They come to you glistening, fresh, vigorous. Simple to grow—planting instructions with shipment—only few square feet ground needed.

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Any trees reported not flourishing within one year, will be promptly replaced without cost to you.

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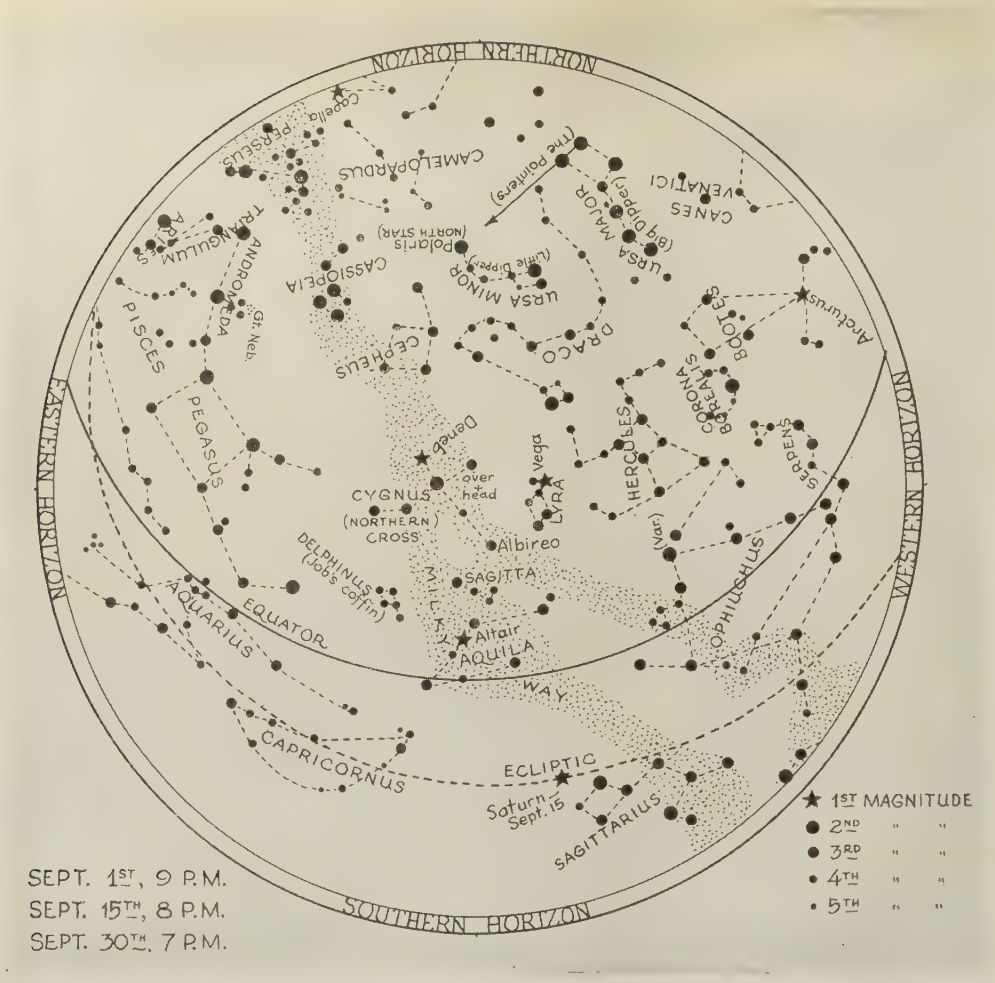

To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

WATCH THE RINGED GIANT

BY ISABEL M. LEWIS

IN THE constellation of Sagittarius, now visible in the southern sky in the evening hours, a little to the northeast of the small inverted dipper that is one of the most conspicuous configurations in this zodiacal group, appears a brilliant stellar object of first magnitude. The steadiness of its light and the fact that in the course of a few weeks its position with respect to the stars will change slightly indicate that it is a planet and not a star.

One who is acquainted with the characteristic colors of the planets, the ruddiness of Mars, the deeply yellowish tinge of Jupiter, and the dazzling brilliancy of Venus, so diamond-like in its splendor, will easily distinguish Saturn from the other bright planets by its yellowish-white light. Saturn is now about midway between Altair and Vega in brightness. Its appearance from the earth varies not only with the distance of the planet from the earth but also, and to a much greater extent, with the different aspects of its rings.

The three rings which surround the planet and make it unique in the solar system lie exactly in the plane of the planet's equator. As the planet revolves in its orbit around the sun the angle which the equatorial plane makes with the earth is continually changing and thus we see the rings now wide, now thin. Twice in the period of the planet's revolution of nearly thirty years the earth lies in the plane of the rings and for a brief period they disappear from view, even in the most powerful telescopes. The angle at which they are seen from the earth then gradually increases until about seven and a half years later when they appear at their widest separation.

At that time the apparent width of the ring system is a little less than half its length and about one-sixth more than the polar diameter of the planet. When the rings are invisible the brightness is about equal to that of the first magnitude star Altair, but (Continued on page 192)

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HOME AND GARDEN

(Continued from page 189)

from trees and shrubs that their roots will not rob the soil. Dig a hole eighteen inches deep and about two feet in diameter; two or three feet deep and as much in diameter would be better because peonies are long-lived plants and good preparation is worth while. Use good soil for the full depth of the hole, well-rotted manure or good compost in the lower part but good soil only in the upper eight inches. Settle the soil well before planting. Place the root with the eyes pointing upwards and cover the eyes about two and one-half inches. Planting too deep or too shallow results in uncertain blooming. Select varieties carefully. It helps to seek the advice of some peony specialist as catalog descriptions are rather indefinite. Good varieties are to be had at reasonable prices.

New perennial borders may be started at this time and old ones should be renovated. Most perennials that have been in one location for several years should be taken up, divided and, after enriching the soil, replanted. Weeds and grass can be cleaned out at this time and adequate supplies of food added for the next year. This periodic rebuilding of perennial borders must not be neglected or your plants will deteriorate, produce inferior flowers and become subject to disease.

Nearly all kinds of hardy bulbs may be planted now except tulips which need not go in until October. Many species make considerable root growth this fall, much to the betterment of their flowers next spring. Prevent manure in the soil from contacting the bulbs and be sure the locations are well drained. If your garden is bothered by moles and their followers, the field mice, you will have either to trap the pests or protect your bulbs by planting them in wire baskets. One extensive bulb planting I saw last year was made in baskets of galvanized, three-eighths square mesh wire. The baskets were about twelve by eighteen, eight inches deep. They were substantially made with a heavy wire around the top edge. This made it possible to take up the entire basket in the spring when the blossoms fade and remove them to an out-of-the-way spot to mature. These mole- and mouse-proof baskets are placed with their rims just at the surface of the soil.

New lawns may be sown at this time and old ones patched up. With new plantings, make sure the top three or four inches of soil is well prepared. Old lawns may

(Continued on page 193)

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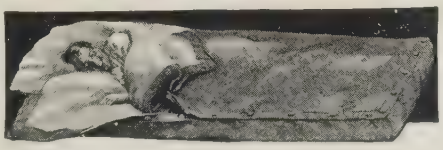

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when the rings are viewed at the other extreme the planet surpasses all stars except Canopus and Sirius in splendor. The rings of Saturn last disappeared from view in 1921 and were seen at their best in 1929. They are now decreasing in apparent width but are still in a most favorable position for observation. One should if possible observe this remarkable planet telescopically this fall when it is so favorably placed in the evening.

Next to Jupiter, Saturn is the largest planet in the solar system and it was the most distant planet known to the ancients. Its nearest possible approach to the earth is about seven hundred and forty-five million miles and at its greatest distance it is 1,027,000,000 miles away.

The planet's equatorial diameter is more than nine times that of the earth, or about 74,100 miles. Its flattening at the poles is greater than that of any other planet and is very conspicuous at the time of the disappearance of the rings. The polar diameter of the planet is nearly eight thousand miles less than its equatorial diameter. The inner edge of the innermost of the three rings (which is known as the dusky or crepe ring, because it is semi-transparent and very faintly luminous) is at a distance of but seven thousand miles from the surface of the planet. Its width is about 11,500 miles. This ring is also known as Ring C. The ring adjacent to it, known as the Bright Ring, or Ring B, is by far the brightest of the three rings. In its most luminous parts it is as brilliant as the surface of the planet. It is a little under sixteen thousand miles wide and is separated by a narrow gap of about one thousand miles from the crepe ring and by a gap of over 2,000 miles from Ring A. The space between rings A & B is known as Cassini's Division. The outermost circlet is about ten thousand miles wide, bringing the total extent of the ring system about one hundred and seventy-one thousand miles. It is probably not more than ten miles in thickness—and it is known to be composed of countless tiny moonlets, the largest of which could not exceed two or three miles in diameter. The outer and inner rings are partially transparent but the particles in the bright ring are much more closely packed, which makes it quite opaque.

The most remarkable thing about this planet aside from its ring system is the fact that its density is only seven-tenths that of water. It is probably composed of a small central nucleus surrounded by many layers of a light gaseous matter, some of which, it it believed, rotate in different periods. Like Jupiter, the planet has a number of belts parallel to its equator but they are less clearly defined and less variable in appearance. There are greenish polar caps and a bright yellowish belt at the planet's equator, and in between several other less distinct belts of varying hues.

Saturn has the same number of satellites as Jupiter, namely, nine. The reported discovery of a tenth, Themis, by W. H. Pickering in 1905 has never been confirmed. He found a very faint object with a period of revolution of about 21 days. It is possible that there may be several very faint satellites still undiscovered.

The largest moon of Saturn, Titan, may be easily seen with a three-inch telescope. In size it is between our own moon and Mercury, and lies about three-fourths of a million miles from the planet. Its period of revolution is nearly 16 days. Five satellites have their orbits between Titan and the ring system. Mimas, the smallest, is only thirty thousand miles beyond the edge of the outer ring. It is about four hundred miles in diameter and speeds around the planet in less than 23 hours. Next in order come Enceladus, Tethys, Dione and Rhea, which are all small bodies from five hundred to eight hundred miles in diameter, rotating between the orbits of Mimas and Titan.

Beyond Titan is Hyperion, a faint satellite with a period of twenty-one days and probably about three hundred miles in diameter. Then after a great gap comes Japetus, about one thousand miles in diameter. It is at a distance of over 2,200,000 miles from the planet and takes more than 79 days to make one trip around it. Compare this with the speedy trip of Mimas in less than 23 hours! Far beyond all the other satellites lies the remarkable little body only one hundred miles or so in diameter known as Phoebe. It was discovered by W. H. Pickering in 1898. This satellite backs or retrogrades around the planet in a period of five hundred and fifty days at a distance of over eight million miles. At the time of its discovery it was the only satellite known to move in its orbit in an east-to-west direction. Satellites VIII and IX of Jupiter, discovered later, were found to have the same peculiarity.

As one gazes with the naked eye at this beautiful object in the southern sky it is difficult to realize that it is a world from which could be made 734 globes the size of our own earth and that it has, in addition, a strange system of rings unlike, so far as we know, any other in the universe, and a large family of nine moons. No object in the heavens appears more strikingly beautiful in the telescope than the planet Saturn and we should not miss an opportunity to observe the planet this month.

The planet Mars is also in the evening sky in September, but is too close to the sun to be seen to advantage. On the fifteenth it will set about one hour after the sun. Mercury becomes a morning star this month and reaches its greatest elongation west on the twenty-first. It will rise on that date about one and one-half hours before the sun. This is the best time of year to see Mercury in the eastern sky before sunrise as the ecliptic now rises most sharply from the eastern horizon. The planet should be easily visible in the morning twilight in the northeast for about a week before and after the date of elongation.

Venus will be in superior conjunction with the sun on the eighth and will be too close to the sun for observation this month.

Jupiter, in Cancer, is now a fine object in the eastern morning sky. On the fifteenth it will be high in the northeast at sunrise.

On September 23 at 7:24 P.M. Eastern Standard Time the sun will cross the equator going south and autumn will begin in the northern hemisphere. At this time day and night will be equal in length all over the world.

(Continued from page 191)

be stimulated and weeds discouraged by an application of cottonseed meal, about sixteen pounds to one thousand square feet. If your soil is lean and poor, a dressing of pulverized peat moss thoroughly worked into the surface will greatly improve its texture. Do not apply too liberally; a one-inch layer is about right. An excessive amount makes the soil too acid and is only favorable to bent grasses.

Deciduous trees and shrubs for fall planting should be selected and ordered. The fall planting season begins with the falling of the leaves, though material from local sources can be moved earlier. Don't fail to prune all newly set deciduous plants, but do not prune evergreens. In planting shrubs and trees, a little extra care in preparing the soil will pay dividends through future years. Do not make the common mistake of hilling up the soil around trees and shrubs. Better leave a slight depression so water may sink into the soil around the plants rather than drain away from them.

Some of the Dutch irises should find a place in your borders. They flower after the narcissus and ahead of the great mass of tall, bearded irises. Dutch irises are of a bulbous nature and should be planted now about five inches deep in clumps in a sheltered, well drained position. They need a liberal mulch during the winter as they will not stand alternate freezing and thawing. Avoid planting in straight lines as they look too stiff; irregular groups and masses are much more desirable. A half dozen in a good range of color and selected to bloom for several weeks would be: The First, White Excelsior, Leonardo da Vinci, Therese Van Duyal-Schwartz, D. Haring and S. Van Ruysdael. Several weeks of bloom may be had from this selection and as cut flowers these bulbous irises are far superior to the germanica type. They ship and handle as readily as gladiolus.

As fall approaches withhold all fertilizer from your roses. Feeding now will stimulate growth, and rather than new wood it is desired that the bushes harden off and get ready for their winter rest. You should also be making plans for the new roses you will plant this fall. It is to be hoped that you will add at least a few things each year. Study the rose catalogs and other rose gardens to learn which are the better, disease resistant varieties. Many recent introductions are a great improvement over the older sorts in this respect.

As the garden year draws to a close look back over the season and strive to learn some lessons from it. Doubtless both success and failure have visited your borders. One cannot avoid all mistakes, but we can learn from them and not make the same errors another year. Study your borders and make careful note of the changes and improvements that should be made. Set for yourself a goal and work towards it. There is no garden so perfect but what it may be improved. This does not necessarily mean extensive changes and additions but refinement of details and perfection in little things. An interest in gardening opens before one an unlimited field for achievement and there is no end to the path which you may follow.

September An Ideal Time To Plant Rock And Other Hardy Plants

ONE advantage is that you can now best tell just what you need for each needy spot. You can also the better plan for shiftings to accommodate new plants.

But of particular importance is that September plantings have ample time to get roots established and do some growing in their new home. That means, next spring they will start early, grow vigorously and give you increased bloom. If then you plant sturdy, full rooted, field-grown plants you will have a still greater assurance of satisfying results. Just such quality stock is Wayside's. The few cents more they may cost per plant, is of passing moment, results considered. Send for catalog. Plant Wayside stock this fall.

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Saving the Cardinals

A mother cardinal that quite unconsciously tipped her young out of the nest, then allowed a human to put them back without showing signs of worry, has joined the circle of friendship of Henry C. Parrish of Riverton, N. J. Mr. Parrish and his wife discovered a cardinal's nest in a silver moon rose bush in his chicken yard; but it was empty. Quite by accident they discovered three baby birds on the ground, partially hidden by leaves and grass, and still very much alive, though they had fallen five feet or more. They were put back in the nest, and the mother bird appeared, seemingly undisturbed by the human interference in her domestic life. After she flew off, the young were again found on the ground, and Mr. Parrish concluded that the mother's weight on the edge of the nest had tipped it sufficiently to cause the birds to roll out. The nest was then put in an empty pint berry box and replaced in the rose bush, while the mother, hovering close by, carefully hid any anxiety she might have felt by picking occasional cherries from a tree in the yard. After the reconstruction was completed she went home and was most arduous in her attention to her young. After a week, two of them were practicing short flights, while the third fearfully eyed the proceedings from the edge of the nest. The next day, he "hopped off" under the able coaching of the even-tempered mother. Mr. Parrish's experience seems quite unusual, in view of the usual excitement with which mother birds watch the touching of their young.

Amateurs Climb Starr King

Mt. Starr King, a thimble-shaped peak east of Yosemite Valley, which has not been scaled since 1877, was conquered again this summer by two youths who figured out on paper a new method of mountain scaling and then applied it to the glacier-polished cliffs of this mountain. These boys, Warren Loose, of Fontana, and Elden Dryer, of Pomona, used no ropes nor spikes, but wore tennis shoes and took the shortest, and steepest, way to the top. The eight hundred feet of really steep climbing took them only twenty minutes. Their system, which they are not quite ready to explain, is based on presenting the largest possible holding surface to the surface to be climbed. They first tested their theory by successfully climbing Half Dome ten feet away from the cable steps that other climbers use.

Atlantic City Flower Show

Many parts of the world will be represented when the second annual Atlantic City Flower and Garden Pageant opens September 4 on its four acres of floral space. Many of the largest horticultural firms and societies will be competing for the $20,000 and more in prizes offered for the best displays. The New Jersey State Gladiolus Show, the Dahlia Society of New Jersey and the Garden State Horticultural Society will combine their exhibits into one great garden which will occupy two acres of the ground. Entries are being made through J. W. Johnston, Director, 383 Bourse Building, Philadelphia.

TREES TO LINE MT. VERNON HIGHWAY

(Continued from page 183)

and fifty to three hundred years, and has been planted in greater numbers in yards and parks and along streets and roadsides than perhaps any other single species.

This memorial highway to America's shrine will be a great inspiration to roadside beautification everywhere. Municipalities can beautify approaches to city limits by tree planting. In this work, the American Tree Association points out, every organization can be allotted space thus making the work a community project.

But elms are not the only trees being planted in this bicentennial tree-planting program. Nut-bearing trees are being used in thousands of places. In memorial forest plantings pines are being used. The planting ranges from one tree to thousands. A certificate of membership in the tree-planting army is sent everyone who registers his Washington bicentennial planting with the American Tree Association. In tree planting the individual, the school, the organization or society can do something worth while. That the American citizen has the vision is shown in the four million plantings now on the national honor roll of the American Tree Association.

WITH ROD AND REEL ON DESERT SANDS

(Continued from page 172)

gained strength by traditional retelling. People are reluctant to be disillusioned of their childhood fairy tales. All sorts of preposterous snake stories are popularly credited because so few scientific men have studied the reptiles, and because public prejudice is so great that it is often impossible to rout it with scientific facts. As long as such conditions exist there will be plenty of work for the herpetologists. The necessity for relieving the world of some of its herpetological ignorance—fear, superstition, needless human suffering as the direct result of ignorance, and the unreasoning destruction of economically valuable reptiles, is almost as great today as it was when I began my study of reptiles more than twenty years ago. My task is far from ended. Only the start has been made.

Hunt for Northern Tropics

A search for hidden tropical valleys in the mountainous regions of northern British Columbia where rare biological and botanical specimens are supposed to exist is being made this summer by Dr. J. Norman Henry and a small expedition. The party started a 35-day trek northward to the confluence of the Toad and Liard Rivers the first of July and will hunt for the strange lowlands somewhere in this region. With Dr. Henry is Mrs. Henry, H. G. McCusker, Canadian governmental topographer, and Dr. Benjamin H. Chamblee, and eleven guides. A pack train of eighty horses is being used, and some five thousand pounds of provisions has been cached for the party along the way. New specimens discovered will be presented to the Academy of Natural Sciences at Philadelphia.

When Squirrel Mothers Act

East is East, and West is West, but on both sides of the North American continent, squirrel mothers act much the same. Whether the scene be the quiet town of Stockbridge, Massachusetts or the towering pines of the Grand Canyon, the least sign of danger to the young is a signal for vigorous action. The other day, according to the Berkshire *Evening Eagle,* a gray squirrel mother in the Bay State town suddenly discovered that her wayward offspring had strayed from home, one to the library lawn across the street, the other to the roof of the library building. Jabbering so excitedly as to attract the attention of passers-by, she raced across the highway to pick up one infant in her mouth and to carry it, much as a cat does her young, back to the nest in the wide-spreading elm. Then she noisily raced back to where the other youth was adventurously peering over the edge of the eaves—but alas, she was too late. Just as she arrived, he lost his balance and fell to the ground. Some of the spectators rushed to the scene, but the mother was there first. Roughly she massaged the back of her injured youngster, and he revived. Then she picked him up in her mouth and started back to the nest. Traffic on the road was heavy, however, and four times she was driven to the curb. At last one of the watchers, Arthur C. Monroe, stepped out and held up traffic while the brave mother crossed.

During the rescue operations, some of the watchers had tried to feed the mother peanuts. She had no time for them, however, but quickly buried them and returned to the task of caring for her child.

At about the same time, in the Grand Canyon, Ranger-Naturalist R. A. Redburn, who tells of his experience in Grand Canyon *Nature Notes,* watched a mother Abert squirrel carry her three young in her mouth from a nest in a yellow pine to a pinyon pine about three hundred yards distant. She carried them upside down with their tails extending between her forelegs in such a manner that they could help support themselves by clinging to her fur. She practically ignored the presence of the ranger, although several times she stopped and eyed him closely as she transported her young.

The reason for the change of nests lay in the fact that the western yellow pine was located close to the road that ran along the east rim of the Canyon, while the pinyon, although not as high, afforded better concealment for the nest.

Camp Health Survey

A complete survey of safety and health in organized camps has recently been made by J. Edwards Sanders for the National Bureau of Casualty and Surety Underwriters, and disclosed the fact that more strict state regulation is needed to cut down the number of accidents and illnesses occurring in the 7,368 camps for children now existing in the United States, and that camp conductors themselves may sharply reduce the injury rate by proper facilities and regulations. The survey includes specific suggestions which may serve as the basis for future legislation, and as a serious, thorough study deserves the careful consideration of health departments everywhere.

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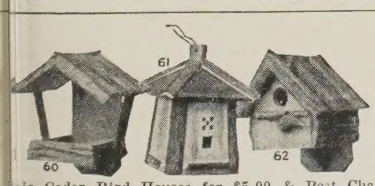

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CHILD'S PARK

(Continued from page 181)

an irregular narrow, stone-flagged path winding about among columbines, jack-in-the-pulpits, trilliums, forget-me-nots, Canterbury bells, and lilies-of-the-valley. The paths are fringed with ferns, and overhead dart birds of various kinds. There are numerous bird houses in this part of the park, and many trees, which are even more to the liking of the wild songsters. Many kinds of birds native to Massachusetts are found here.

Here are bleeding hearts, rhododendrons, showy lady slippers, azalia, foxgloves, and double snowballs. There are a few hemlock trees. The girls from Smith College come annually and semi-annually to do research work here in connection with their botany classes.

Mr. Child has found the study of geological curiosities very fascinating, and has made a great effort to secure odd-shaped stones and unusual formations for his park. These have been brought from many different states, and sometimes he has paid as much as fifty dollars for the transportation of a single stone. He has some curious round rocks from North Dakota, and magnetic iron ore brought from the western part of his own state. Some of the rocks are quite large and serve as seats. A few are shaped like anvils. Others are arranged in little groups near the wide driveways.

This park is particularly attractive because of the lovely vistas. Mr. Child has taken much pains with the arrangement of trees and shrubbery, making some areas extremely formal, and others delightfully informal. There are stone benches at intervals on which the visitor may sit and rest.

To keep the park in such perfect condition throughout the spring, summer and autumn months is in itself no small task. Mr. Child has found it necessary to employ a gardener and fifteen assistants for this purpose most of the time. Guards are on duty at night and at other times for the protection of visitors and to insure the safety of the plants and trees. The people of Northampton feel that Mr. Child's hobby has added much to the beauty and interest of their town.

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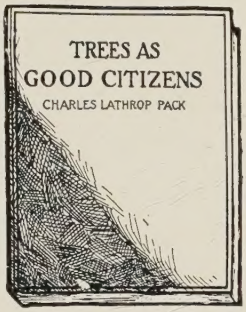

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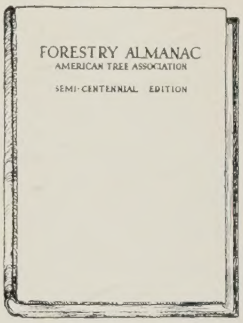

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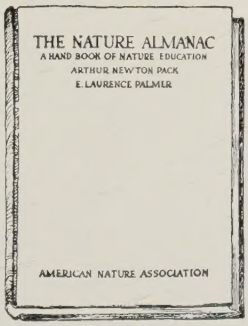

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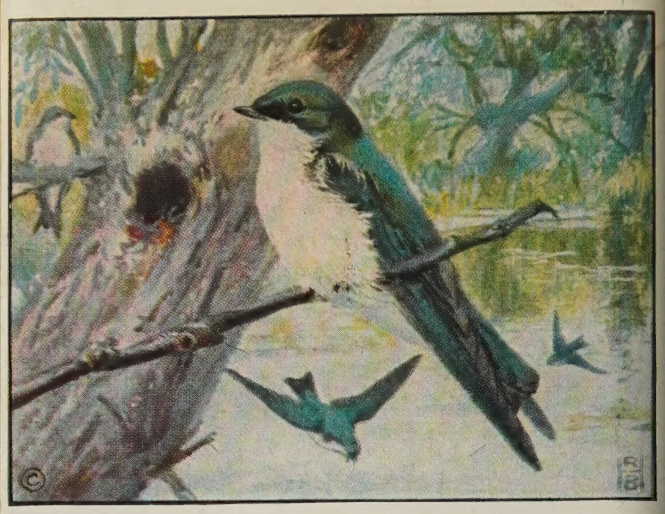

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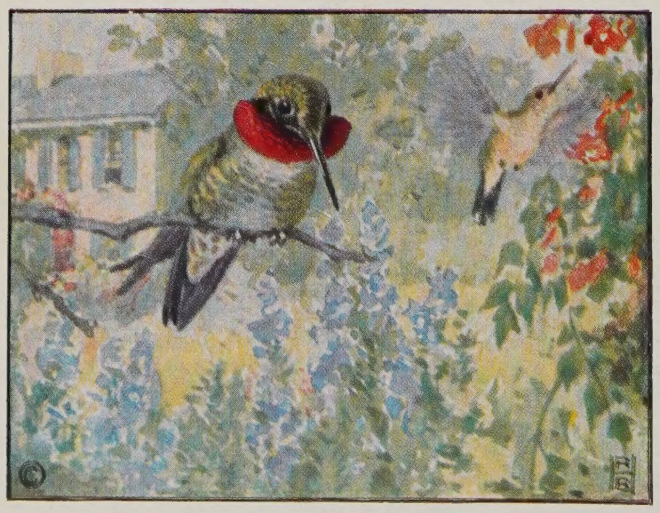

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